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ROYAL BOTANIC GARDENS, KEW

XXIX—NEW MATERIAL OF MONOTES KERSTINGII FROM THE GOLD COAST.

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Very complete and representative material of *Monotes Kerstingii* Gilg* has recently been sent to the Imperial Forestry Institute by Mr. C. Vigne, Assistant Conservator of Forests in the Gold Coast Colony.

Gilg's original description of this species (2, pp. 288–290) has been extended by Hutchinson and Dalziel (3, p. 197 ; fig. 87), so that the essential diagnostic features are already sufficiently well known. It seems, however, desirable to give a brief account of the ecology of *M. Kerstingii* in the new habitat recorded by Mr. Vigne, together with a description of the wood anatomy of the species.

The Gold Coast material comprises herbarium specimens of flowering branches and wood blocks from the same tree : one from the centre of the original trunk, showing a heart-wood of irregular contour, very distinct from the sap-wood, and a second from the periphery of the trunk, with the bark attached. The bark shows a close, layered structure, is reddish-brown in colour and is finely and irregularly fissured externally ; it varies in thickness from 5 to 9 mm. Mature fruits from another tree were subsequently sent by Mr. Vigne, who informs the writer that he obtained the material from the Bosomoa Forest Reserve, at a point 12 miles south of Kintampo (8° 2′ N. by 1° 52′ W.), the only place in the Gold Coast Colony, so far as he is aware, from which *Monotes Kerstingii* has, as yet, been recorded, although he believes it to occur elsewhere. The tree is not common, however, and Mr. Vigne has not been able to discover any vernacular name applied to it.†

ECOLOGY

In the Bosomoa Reserve, *Monotes Kerstingii* attains a height of 40 feet and a girth of 4 feet, growing in comparatively wet savanna woodland, near the edge of the closed forest, at an altitude of approximately 1000 feet‡; the soil it inhabits is sandy, with outcrops

* *Vigne* 3000.

† No vernacular name was recorded by Gilg in his original account of the species (2, pp. 288-290) ; or by Hutchinson & Dalziel in their description of *M. Kerstingii* as occurring in the French Sudan, French Guinea, Togoland and Northern Nigeria (3, p. 197).

‡ *Cf.* the conditions under which the species was originally discovered by Kersting in Upper Guinea, namely in open savanna, at an altitude of 400 metres (2, p. 290).

of sandstone ; and the rainfall of the area is about 60 inches, with a pronounced dry season in December, January and February. Flowering takes place in June, the month of heaviest rainfall, and fruiting in November and December.*

The area from which *Monotes Kerstingii* is recorded is interesting as being the only station where Mr. Vigne has found *Faurea speciosa* Welw. and *Protea Elliotii* C. H. Wright ; other associates are common savanna trees, such as *Uapaca togoensis* Pax, *Lophira alata* Banks, *Terminalia sokodensis* Engl., *Syzygium guineense* DC., *Crossopteryx febrifuga* Benth., *Hymenocardia acida* Tul., *Cussonia longissima* Hutch. et J. M. Dalz., *Detarium senegalense* Gmelin, *Vitex Cienkowskii* Kotschy, *Bridelia ferruginea* Benth., *Burkea africana* Hook. f., *Daniellia Oliveri* Hutch. et J. M. Dalz., *Lannea acida* A. Rich., *Entada abyssinica* Steud., *Parinari curatellaefolia* Planch.,† and *P. polyandra* Benth.; also certain shrubs, such as *Grewia mollis* Juss. and *Pavetta crassipes* K. Sch.

The Characters of the Wood

General Properties

Very hard and very heavy.

Weight of air-dry wood :—about 66 lbs. per cubic foot.

Specific Gravity of air-dry wood :—1·057.

Texture :—fine and close.

Grain.—Fairly straight ; occasional irregularities occur in the longitudinal direction of the elements.

Colour.—Sap-wood reddish-brown with occasional dark lines running longitudinally through the wood ; these appear as short, radially-extended flecks on the transverse surface of the wood. Heart-wood distinctly darker than sap-wood, with a blackish tinge.

Lustre.—Slight.

Macroscopic Features

Growth Rings.—Visible on transverse surface, and occasionally on radial surface. Marked by darker colour and denser appearance of ground-mass of wood, with somewhat fewer vessels ; occasionally rings more distinctly marked by complete absence of vessels.

Vessels.—Visible only with lens on transverse surface ; typically solitary, numerous, evenly distributed (except for point noted above), with occasional tendency to alignment in short oblique series. Vessel-lines visible to eye on longitudinal surfaces ; individual elements visible with lens.

Ground-Mass of Wood.—Dense, individual elements not distinct, even with lens ; soft tissue not visible.

Rays.—Extremely fine, very numerous and closely-set. Visible only with lens on transverse surface ; hardly visible with lens on

* Kersting found the species flowering in May, and fruiting in October, in Upper Guinea.

† *Monotes Kerstingii* is sometimes mistaken for this species.

PLATE VIII

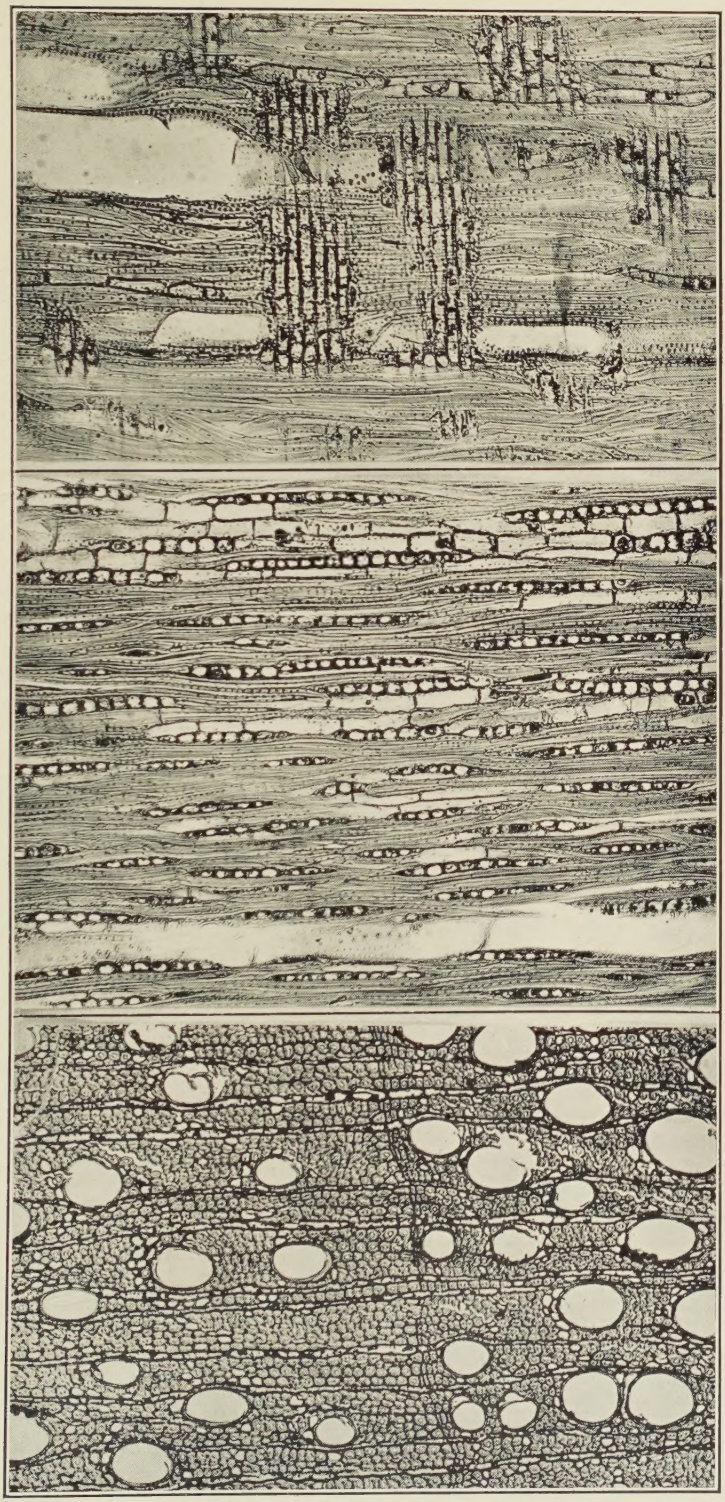

Fig. 1.
Tranverse section.

Monotes Kerstingii Gilg
Fig. 2.
Tangential section.

Fig. 3.
Radial section.

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tangential surface; visible to eye on radial surface as fine horizontal streaks of same colour as ground-mass in heart-wood, but of somewhat darker colour in sap-wood. With lens, rays seen to be very faintly marked with fine glistening horizontal lines, indicating horizontal walls of ray-cells.

Ripple-Marks.—Absent.

Secretory Canals.—Absent ; occasional dark lines, however, appear to indicate the presence of resin in the tissues.

Microscopic Features

(Plate VIII, Figs. 1, 2 & 3)

Growth-Rings.—Irregular in contour ; marked by decrease in size and number of vessels (in some cases by their complete absence), also by absence of diffuse parenchyma cells, and in some cases by radial compression of from 1 to 3 or 4 rows of fibres, which are, at these points, more definitely radially arranged than elsewhere : this feature, however, is very irregular.

Vessels.—*Arrangement :* scattered and fairly evenly distributed, except at boundaries of growth rings ; bounded on one or both sides by rays ; generally solitary, with tendency to arrangement in short oblique series ; pairs very infrequent ; groups of more than 2 vessels extremely rare.

Numerical distribution : moderately numerous to numerous ; 21 ± 3 solitary vessels per sq. mm., with approximately 0·95% of pairs.

Size : very small to (generally) small ; tangential diameter of solitary vessels in transverse section, $61 \pm 15\mu$; radial diameter, $98 \pm 20\mu$; vessel-elements generally short ; length, $436 \pm 90\mu$.*

Form of vessel-elements : elongated and straight-sided, elliptical in transverse section ; with and without " tails " at one or both ends ; tails variable in length and breadth.

Perforations : simple ; horizontal or oblique, the longer elements having the more oblique perforations.

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* The classes here used for numerical distribution and size of elements and rays are those proposed by Chattaway (1). The figures represent the mean and standard deviation of 100 counts or measurements, except in the case of vessel-element length. In this instance, measurements were taken only from macerated material, because of the difficulty of determining the *complete* length of each element from sections. Although a large amount of macerated material was examined, only 29 whole and perfect elements were discovered, and only these were ultimately considered. The mean length and standard deviation given above were obtained by measuring the *total* length of each element, including the " tails " where these were present ; this was the case in 14 out of the 29. Neglecting the tails, as suggested by Chattaway (1, p. 24), the mean length and standard deviation were $394 \pm 94\mu$.

It may be noted that the longer vessel-elements were not necessarily those with tail-like extensions ; out of the 29 elements, 7 were 500μ, and above, in length : 2 of these were without tails.

(N.B. The method of expressing counts and measurements in terms of means and standard deviations, rather than as maxima or ranges, according to general practice, is due to a suggestion made by Mr. S. H. Clarke, of the Forest Products Research Laboratory, in an as yet unpublished paper. The writer is greatly indebted to Mr. Clarke for the opportunity to see his work.)

Walls : comparatively thin.
Pits : mainly small, a little variable in size ; numerous, but non-contiguous ; somewhat unevenly distributed ; apertures somewhat rounded, or (generally) elliptical or slit-like, at varying inclinations or horizontal. Vessel-fibre pits distinguishable as being in regular lines, with an almost vertical to somewhat spiral direction. All pits bordered, with whatever elements they communicate, except those communicating with marginal cells of rays (and sometimes, in the case of higher rays, with certain central body cells also) ; these are simple, larger than all others, elliptical to irregular in shape ; in some cases the apertures appear to have somewhat thickened rims, and suggest actual perforations rather than pits.*
Tyloses : present.
Vessel-contents : occasionally resinous, in connection with the tyloses.

TRACHEIDS.—None observed.

FIBRE-TRACHEIDS.—Typical examples somewhat wider and thinner-walled than true libriform fibres ; elongated, similar in length to the fibres, tapering and pointed at ends ; generally pitted throughout length ; pits bordered, with narrow oblique apertures. Transitions to true fibres occur.

FIBRES.—*Arrangement :* forming main ground-mass of wood ; irregular in arrangement generally, but occasionally forming subradial to radial rows at limits of growth-rings, where individual fibres tend to be radially compressed. Course vertical to somewhat oblique and irregular ; occasionally ends of fibres turn at right angles and follow horizontal course of rays.
Shape : variable in transverse section, depending on arrangement ; elongated, tapering gradually, generally sharply pointed.
Length : short ; $1{\cdot}275 \pm 0{\cdot}24$ mm.
Walls : thick to very thick, not varying appreciably in thickness in early and late wood.
Lumina : very small in comparison with thickness of walls ; rounded, elliptical or slit-like in transverse section, according to outline of fibre-elements.
Pits : on all walls, and throughout length, except in the case of elements with very slender-pointed ends ; bordered, with oblique to nearly vertical slit-like apertures.
Septation : absent.
Contents : none.

PARENCHYMA.—*Amount :* fairly abundant.
Arrangement : metatracheal—diffuse, with very occasional tendency to form uniseriate tangential lines of 3 or 4 cells, or small groups ; *paratracheal*—fairly conspicuous, never forming complete sheaths round vessels, but often forming small " caps " to larger vessels.
Appearance of cells : in transverse section—somewhat variable n size, often rather large, rounded to irregular in shape ;

* Owing to the small size and delicate nature of the structures, it has not yet been possible to obtain conclusive evidence on this point.

in longitudinal section—not very conspicuous, typically in short single vertical series, in which cambiform rows are not obvious; cells elongated vertically, though variably so; end walls mainly horizontal.

Pits : small, simple; not numerous, but occasionally very distinct on vertical walls, rounded to elliptical in shape; interparenchyma pits (on end walls) not grouped.

Crystal-bearing cells : absent.

Cell-contents : variably resinous.

Rays.—*Arrangement :* closely-set and very numerous, 16 ± 2 per mm.; deflected by, and contiguous to, vessels, or separated from them by 1 or 2 series of ground-tissue elements; non-storeyed. *Shape and size :* narrowly spindle-shaped in tangential section of wood; extremely fine; uniseriate, very rarely locally biseriate, $12\pm3{\cdot}4\mu$ in width; extremely low, from 2–29, frequently from 3–11, and most frequently 9, cells, and $174\pm105\mu$ in height. *Ray-type and shape of ray-cells :* slightly heterogeneous; *in transverse section*—cells generally radially elongated, though variably so, often compressed by contour of vessels; *in tangential section*—marginal cells oval, body cells rounded or squarish to (generally) elliptical; *in radial section*—cells generally horizontally elongated, though sometimes almost square; upper and lower marginal cells more variable than others. End walls of cells upright to inclined, sometimes curved.

Walls : comparatively thick.

Pits : simple, on all walls of cells; numerous on end walls; generally small and rounded or elliptical, but large and elliptical to somewhat irregular in shape on walls of 1 or 2 series at upper and lower margins, and also on walls of certain central body cells of higher rays, where these are in contact with vessels. (In some cases, these large " pits " have the appearance of actual perforations; *cf.* description of vessel-pits).

Contents : resinous.

The writer wishes to express her grateful thanks to Mr. C. Vigne for the material of *Monotes Kerstingii* Gilg here described, and for information regarding the habitat of the species; to Mr. A. L. Clinkard for the photographs forming Plate I; and also to the Christopher Welch Trustees for a grant enabling this research to be carried out.

References.

1. Chattaway, M. M. " Proposed Standards for Numerical Values used in describing Woods." *Tropical Woods*, **29**, 20 (1932).

2. Gilg, E. " Weitere Beiträge zur Kenntnis der Afrikanischen Dipterocarpaceen-Gattung *Monotes*." *Engl. Bot. Jahrb.* **41**, 287 (1908).

3. Hutchinson, J., and Dalziel, J. M. *Flora of West Tropical Africa*, **1** (1927).

XXX—CONTRIBUTIONS TO THE FLORA OF TROPICAL AMERICA: XXI.*

Fungi collected in British Guiana, chiefly by the Oxford University Expedition, 1929.

E. M. Wakefield.

The fungi enumerated in the following list were for the most part collected between the middle of August and the end of November 1929, during the visit of the Oxford University Expedition to the Colony. Mr. Paul W. Richards was responsible for the collection of fungi, and he was assisted for about a fortnight in October by Mr. E. B. Martyn, mycologist to the Department of Agriculture for British Guiana. Other members of the Expedition contributed occasional specimens, but all these are cited under the numbers given by Richards. Earlier records of the same species have been added, as giving some indication of relative frequency. Further some additional records made by Martyn have been included, since these were obtained from similar forest areas, and provide valuable supplementary information as to the types of fungi found in these regions.

The fungi collected by the Oxford University Expedition were all obtained from the rain-forest area, characterised by high and even temperature and constantly high humidity. Most of the specimens came from a relatively restricted area near the camp at Moraballi Creek, near Bartica, on the river Essequibo, but a few were collected at the first Falls of the Essequibo, lower down the river. The phanerogamic vegetation of the Moraballi Creek region has been described in detail by T. A. W. Davis and P. W. Richards in the Journal of Ecology (**21**, 350: 1933, and **22**, 106: 1934). For explanations of the five types of forest associations (Mora, Morabukea, Greenheart, Mixed and Wallaba) mentioned in recording habitats the reader is referred to these papers.

Mr. Martyn's additional records were made chiefly just north of the Tinamu Fall, near the junction of the Cuyuni River with the Essequibo, and at Mabaruma in the North-Western District.

Of particular interest are the many species of stipitate Polyporaceae, such as the genus *Amauroderma*, which are contained in these relatively small collections. Tropical South America appears to be rich in these forms, which are found amongst dead leaves in the shade of the forests, and probably grow from buried roots. Unfortunately these fungi usually occur as solitary specimens, and many of the species recorded hitherto are known only from the type gatherings, which in some cases are very scanty. The material now available has furnished data for more adequate descriptions of several forms, notably *Amauroderma renatum*, which has been regarded as a very doubtful species and was referred by Bresadola to *A. exile*. It is very close to *A. exile* in structure, but is distinguished by the larger pores and by its spores.

*Continued from K.B. 1934, 205.

The Oxford University Expedition collection was comparatively rich in entomogenous fungi. These have been worked out by Mr. T. Petch and are the subject of a separate paper.*

In the compilation of the following list material preserved at Kew and in the herbarium of the Department of Agriculture, British Guiana, has been examined, and as far as possible the older records cited have been checked. Synonymy is given only in so far as it refers to British Guiana records. Certain unlocalised records which are cited are to be found in Richard Schomburgk's "Reisen in Britisch Guiana, 1840-44" (which includes the earlier records of G. F. W. Meyer), in Berkeley's Decades, and in a list by M. C. Cooke in Grevillea, **13**, 32 (1884).

For the determination of the species of *Hypoxylon* and *Nummularia* I am indebted to Professor J. H. Miller, who examined the specimens during his visit to Kew in 1930.

Hymenomycetes.

Lentinus crinitus (*Linn.*) *Fr.* Syst. Orb. Veg. **1**, 77 (1825). *L. nigripes* Fr. ex Kl. in Linnaea **8**, 479 (1833) ; *L. fumigatus* Lév. in Ann. sci. nat. sér. 3, **5**, 117 (1846) ; *L. Schomburgkii* Berk. in Trans. Linn. Soc. **20**, 111, (1846).

On dead log, Moraballi Creek, October 16th, 1929, *Richards* 590 ; without locality, *Schomburgk* (Brit. Guiana, **3**, 868).

The collector's note with No. 590 states that both pileus and gills are at first white, becoming brownish later.

Schizophyllum radiatum (*Sw.*) *Fr.* Nov. Symb. in Nova Acta Sci. ser. 3, **1**, 41 (1851).

On dead trunk of *Protium* sp., Moraballi Creek, September 19, 1929, *Richards* 402 ; on lime, Essequibo River, October 1923, *Altson* 44.

The determination of this species is in accordance with the recent paper by Linder (Amer. Journ. Bot. **20**, 557 : 1933), who maintains that it is distinct from *S. commune* Fr. Probably older records from British Guiana under the name *S. commune* refer also to *S. radiatum*. These are :—Near Bartica Grove, November 1886, *Jenman* 2344 (as *S. commune* var. *flabellare*) ; Mazaruni, July 1904, *Bartlett* 7930.

Polyporus camerarius *Berk.* in Hook. Journ. Bot. **8**, 143 (1856).

On ground in swamp, north of Tinamu Fall, Cuyuni River, Essequibo, March 7th, 1931, *Martyn* 295 ; among dead leaves on floor of Greenheart bush, north of Tinamu Fall, March 10th, 1931, *Martyn* 323 ; without locality, det. M. C. Cooke in Herb. Kew.

Both the recent specimens were solitary. Although resembling a species of *Amauroderma* in habit, this species differs from the

*See K.B. 1934, 202.

accepted definition of that genus in its white flesh and almost hyaline hyphae. Spores not found, but probably hyaline.

P. Rhizomorpha *Mont.* in Ann. sci. nat. sér. 2, **13**, 202 (1840).

On dead twig in undergrowth, Moraballi Creek, October 29, 1929, *Richards* 716; on bark of living tree, Conawarook River, September 1905, *Bartlett* 8612; on log, Weri-Werai-kam Creek, Essequibo, August 1930, *Martyn* 199.

Bartlett 8612 includes one sporophore, but the other specimens consist of rhizomorphs only.

P. Leprieurii *Mont.* in Ann. sci. nat. sér. 2, 13, 203 (1840). *P. subelegans* Murr. in N. Amer. Flor. 9, 62 (1907).

On log, Supenaam Forest Reserve, Bartica, August 15, 1930, *Martyn* 209; on tree-trunk, Mabaruma, North Western District, November 1928, *Martyn* 2; on dead branch, north of Tinamu Fall, Cuyuni River, March 10, 1931, *Martyn* 326; without locality, Herb. W. J. Hooker (Kew); without localities, Herb. Dept. Agric. Brit. Guiana, *Bartlett* 8045; without locality, Schomburgk (Brit. Guiana 3, 869).

Herbarium specimens of this species become uniformly deep alutaceous or even chestnut-brown in colour on the upper surface. According to the collector's notes with Nos. 2 and 209, however, the pileus when fresh is cream to light brown, and the pore-surface dark brown in colour. No. 326 is a very small form, very shortly stipitate, and with a regular somewhat spathulate pileus. At first sight it appears very different from the large, lobate fungus which is the usual form found. In microscopic structure, however, it is identical, and may be only an early stage.

P. guianensis *Mont.* in Ann. sci. nat sér. 2, **13**, 201 (1840).

On dead log, Moraballi Creek, October 25, 1929, *Richards* 683.

P. sulphureus (*Bull.*) *Fr.* Syst. Myc. **1**, 357 (1821).

On dead log, Moraballi Creek, October 16, 1929, *Richards* 620.

This fungus agrees with the European form in microscopic structure and in the presence of conidia. It is, however, thinner than the usual temperate form, and flabellate, with a short stalk. The collector's note states that it was white when fresh, tough and fleshy.

P. albo-gilvus *Berk.* et *Curt.* in Journ. Linn. Soc. **10**, 308 (1869).

On dead log, Moraballi Creek, October 21, 1929, *Richards* 656.

The tissue is very brittle when dry, on account of the abundant crystals contained in it. Lloyd has stated that this species is the same as *P. flavescens* Mont., but according to a note by Bresadola in the Kew Herbarium this is not the case.

P. gilvus (*Schw.*) *Fr.* Elench. **1**, 104 (1828).

On rotten bark in light, well-drained part of forest, Moraballi Creek, August 22, 1929, *Richards* 175 ; on dead log, Moraballi Creek, October 24, 1929, *Richards* 671.

The specimens are of a thin form, approaching *Polystictus licnoides* (Mont.) Fr.

P. nivosus *Berk.* in Hook. Journ. Bot **8**, 196 (1856).

On branch of felled tree in Wallaba forest, Moraballi Creek, October 19, 1929, *Richards* 621.

According to the collector's note the pore-surface in this specimen was greyish to brown when fresh, and the dried specimen does not give the impression of having been pure white. The spores are cylindrical, 8–9×2·5–3μ. In this character and in the paler flesh the species differs from *P. neofulvus* Lloyd.

P. valenzuelianus *Mont.* in Ramon de la Sagra, Hist. Cuba (Pl. Cell.), 398 (1845).

On dead log in Wallaba Forest, Moraballi Creek, October 19, 1929, *Richards* 622.

P. micromegas *Mont.* in Ramon de la Sagra, Hist. Cuba (Pl. Cell.), 423 (1845).

Common on all dead wood. In Wallaba forest, Moraballi Creek, October 11, 1929, *Richards* 547 ; Moraballi Creek, October 16, 1929, *Richards* 582 ; October 25, 1929, *Richards* 681 ; without precise locality, September 1904, *Bartlett* 8416 ; Cuyuni River, October 1904, *Bartlett* 8340, 8368.

When fresh *P. micromegas* has usually a salmon-pinkish (coral) tinge on both surfaces, but the colour is variable. No. 547 is noted as being "dull orange-yellow." *Bartlett* 8368 is subresupinate.

The species was referred to *P. zonalis* Berk. in Saccardo's Sylloge, but, as Bresadola has pointed out, it is distinct from that species.

Amauroderma renatum (*Berk.*)*Murr.* in North Amer. Flora **9**, 117 (1908).

On humus on floor of Morabukea forest, Moraballi Creek, August 24, 1929, *Richards* 214 ; among dead leaves in deep shade, Morabukea forest, Moraballi Creek, September 5, 1929, *Richards* 329 p.p.; on floor of forest, Moraballi Creek, October 24, 1929, *Richards* 673 ; among dead leaves on floor of Greenheart bush, north of Tinamu Fall, Cuyuni River, March 10, 1931, *Martyn* 324, 325 ; in open high mixed bush and Greenheart, north of Tinamu Fall, March 10, 1931 *Martyn* 334 ; on rather swampy ground, among leaves, north of Tinamu Fall, March 7, 1931, *Martyn* 297A ; Conawarook River, September 1905, *Bartlett* 8615.

Most of the specimens here enumerated are more fully developed than the type specimens from Brazil, and were only placed in this

species after careful comparison of the microscopic characters. The type material of *Polyporus renatus* Berk. consists of three specimens. One of these is a tall form with a slender, regular stem and very minute greyish pores. This may well be the same as *P. exilis* and may have influenced Bresadola in referring this species to *P. exilis*. The other two specimens, on the other hand, are different in habit, having a lobed, rather irregular pileus, and a somewhat stouter and more irregular (twisted or nodulose) stem. The pores in these two specimens are for the most part not properly developed, but in one of them there are two patches of fresh pores overgrowing the older layer, and these are obviously considerably larger than those of *P. exilis*, though not as large as those of the present specimens. The colour of the flesh is cinnamon.

In most of the specimens under consideration the pores are large, up to ·5 mm. in width and even 1 mm. in the longer diameter. They are thin-walled, polygonal, and radially elongated, but rather shallow. The general colour of the pore-surface is brown, approximately " Saccardo's umber " of Ridgway. The hyphal structure is similar to that of *A. exile*, but the spores, which are present in *Martyn* 325, are different, being elliptical, very pale fuscous (almost hyaline), and 12–13×9μ. The flesh of the pileus is very thin and " Sayal Brown " in colour.

No. 329 was mixed with *A. exile*, and but for the difference in spores it might be supposed that these two species were forms of one. On the whole, however, *A. renatum* is larger than *A. exile*, and the pileus is more infundibuliform and frequently laterally cut.

Amauroderma exile (*Berk.*) *Lloyd*, Syn. Stip. Polyp. 120 (1912), sub icone. *Ganoderma* (*Amauroderma*) *exile* (Berk.) Pat. in Bull. Soc. Myc. Fr. 5, 77 (1889).

Among dead leaves in deep shade, Morabukea forest, Moraballi Creek, September 5, 1929, *Richards* 329 p.p.; arising from dead leaves on the ground and from dead stems in mixed forest, Mabaruma, North-Western District, November 1928, *Martyn* 8 p.p.

Apparently common in such situations. A small, slender species. Spores are present in No. 8 and are almost hyaline, thin-walled, subglobose, 8μ diameter or 8×7μ.

A. partitum (*Berk.*) *Wakef.* comb. nov. *Polyporus partitus* Berk. in Hook. Journ. Bot. 8, 170 (1856).

On swampy ground among leaves, north of Tinamu Fall, Cuyuni River, March 7, 1931, *Martyn* 297.

The pores in this species are large, like those of *A. renatum*, but it differs in that both flesh and pore-surface are whitish. Spores not seen in this specimen, but in the type (Spruce 20), they are yellowish, smooth, 11–13×8–9μ. On account of the white flesh Patouillard did not include this species in his account of the genus *Ganoderma*, and has placed it in the section *Leucoporus*. In general habit and in the large yellowish spores it is, however, too closely

allied to such forms as *A. exile* and *A. renatum* to be placed in another genus. Bresadola (Ann. Myc. **14**, 238 : 1916) first noted that it is an *Amauroderma*, but did not actually make the combination.

A. macrum (*Berk.*) *Wakef.* comb. nov.

Ganoderma (*Amauroderma*) *macer* (Berk.) Pat. in Bull. Soc. Myc. Fr. **5**, 79 (1889).

On the ground at foot of stump, Moraballi Creek, October 24, 1929, *Richards* 672.

If correctly referred this is a younger specimen than the single fruit-body which constitutes the type, and the description requires some amplification. The upper surface of the pileus is covered at first with a deep-brown matt to velvety coating, showing bare blackish concentric zones. In the dried specimen the pileus has a pale margin, and the pore-surface is pale brown, of the same colour as the flesh. The collector's notes from the fresh specimen are " Hymenial surface white, upper surface chocolate-brown, narrow white margin."

The pores are thick-walled, but not as " ocellate " as in the type specimen. Spores subglobose, smooth, pale fuliginous, 10–11μ in diameter.

A. Schomburgkii (*Mont. et Berk.*) *Lloyd*, Syn. Stip. Polyp. 118 (1912) sub icone. *Ganoderma* (*Amauroderma*) *Schomburgkii* (Mont. et Berk.) Pat. in Bull. Soc. Myc. Fr. **5**, 77, (1889).

On floor of forest, in shade, Moraballi Creek, October 25. 1929, *Richards* 678 ; without precise locality, *Schomburgk* (type).

This specimen has a second pileus growing above the old one, on a single stem 8 to 10 inches high.

A. variabile (*Berk.*) *Lloyd*, Syn. Stip. Polyp. 112 (1912), sub icone, *Ganoderma* (*Amauroderma*) *variabile* (Berk.) Pat. in Bull. Soc. Myc. Fr. **5**, 76 (1889).

Among dead leaves on floor of mixed forest, Moraballi Creek, August 22, 1929, *Richards* 167.

A single specimen. Spores not found.

A. longipes (*Lév.*) *Lloyd*, Syn. Stip. Polyp. 116 (1912) sub icone. *Ganoderma* (*Amauroderma*) *longipes* (Lév.) Pat. in Bull. Soc. Myc. Fr. **5**, 75 (1889).

Solitary, on floor of mixed bush (crabwood and Mora) on dry, sandy soil, near Tinamu Fall, Cuyuni River, Mar. 3, 1931, *Martyn* 271 ; without precise locality, *Schomburgk* (Brit. Guiana 3, 869).

A. ocellatum (*Berk.*) *Lloyd*, Syn. Stip. Polyp. 118 (1912) sub icone. *Polyporus ocellatus* Berk. in Hook. Journ. Bot. 8, 172 (1856).

On rotting tree-stump in dry, well-lit Wallaba forest, Moraballi Creek, September 26, 1929, *Richards* 485 ; in forests of Ohio Creek,

West Kaluni River, Mazaruni River, May 5, 1929, *A. Wade* ; without precise locality, 1884 (as *Fomes pansus*, det. M. C. Cooke) in Herb. Kew.

The types of *Polyporus ocellatus* from Brazil were thin, polystictoid forms, with smooth, zoned pileus. These Guiana specimens are much larger, the pileus is thicker and tends to become radially rugulose. The pores are always thick-walled and more or less glaucous, but the " ocellate " condition is probably a question of age. The species is marked by its very hard, rigid texture, due to the presence in the pore-walls of thick-walled, brown, skeletal hyphae, the projecting ends of which may be forked. The flesh of the pileus is thin and red-brown.

Ganoderma opacum (*Berk. et Mont.*) *Pat.* in Bull. Soc. Myc. Fr. **5,** 67 (1889).

At base of a large tree in Greenheart bush, north of Tinamu Fall, Cuyuni River, March 10, 1931, *Martyn* 328.

In its central stem and dull, zoned crust this species suggests *Amauroderma*, but the spores are typically those of *Ganoderma*.

G. nitidum *Murr.* in North Amer. Flora **9,** 123 (1908).

On rotting stump in dry, well-lit Wallaba forest, Moraballi Creek, September 26, 1929, *Richards* 486.

These are small specimens, somewhat ungulate in shape, and with thicker flesh than the type. They agree with Murrill's species in the very resinous crust of the pileus and in the small (9–10 × 8 μ), only slightly pitted spores. The pore surface of the dried specimens is yellow, but the collector's note states that it was pure white when fresh.

G. tuberculosum *Murr.* in North Amer. Flora **9,** 12 (1908).

On decayed tree-stump, Lamaha Dam, Botanic Gardens, Georgetown, November 1929, *Martyn* 167.

The collector's note states that the hymenium was cream-colour when fresh, the upper surface of the pileus red-brown, shining, with a yellow (mustard-colour) margin. The species is near to sessile forms of *G. lucidum*, but is easily distinguished by the smaller and more globose spores.

G. fornicatum (*Fr.*) *Pat.* in Bull. Soc. Myc. Fr. **5,** 71 (1889). *G. subfornicatum* Murr. in N. Amer. Flor. **9,** 121 (1908).

On dead trees in well-lit forest, Moraballi Creek, September 23, 1929, *Richards* 487 ; near Ananda-basu, right bank of Maicwac River, April 1926, *Altson* 554 ; Conawarook River, September 1905, *Bartlett* 8698.

In No. 487 the specimens vary from stipitate to almost sessile.

G. applanatum (*Pers.*) *Pat.* var. **tornatum** (*Pers.*) *Humphr.* in Philipp. Journ. Sci. **45,** 543 (1931).

On fallen tree-trunk in mixed rain-forest, Moraballi Creek, August 21, 1929, *Richards* 136 ; on trunk of dead *Licania buxifolia* Sandw. in dark Wallaba forest, Moraballi Creek, October 7, 1929, *Richards* 529 ; on fallen log, mixed forest, Moraballi Creek, October 17, 1929, *Richards* 604 ; on dead log, Moraballi Creek, October 21, 1929, *Richards* 659 p.p.; on dead log, Upper Arawan River, Aruka Road, North-Western District, May 1929, *Martyn* 60 (stipitate form).

No. 60 is of the form which has passed as *Ganoderma gibbosum* (Bl. et Nees). The small spores are those of var. *tornatum* Pers. as understood by Humphrey.

Fomes hornodermus (*Mont.*) *Cooke* in Grevillea **13,** 119 (1885). *F. sulcatus* Cooke in Grevillea **13,** 32 (1884).

On very old rotting stump of Greenheart (*Ocotea Rodiei*) in mixed forest, Moraballi Creek, September 25, 1929, *Richards* 460 ; on under side of large dead branch in undergrowth of swampy " Low Bush," Moraballi Creek, November 13, 1929, *Richards* 798 ; without precise locality, in Herb. Kew (type of *F. sulcatus*).

No. 460 consists of small neat specimens, like the material on which *F. sulcatus* was founded. No. 798 is a semi-resupinate specimen, extending for some distance along a branch, with only a narrow reflexed margin.

F. microporus (*Sw.*) *Cooke* in Grevillea **14,** 20 (1885). *F. Auberianus* (Mont.) Murr. in Bull. Torr. Bot. Club **32,** 491 (1905).

On dead log, Moraballi Creek, October 17, 1929, *Richards* 616 ; on dead log, north of Tinamu Fall, Cuyuni River, March 10, 1933, *Martyn* 333.

The collector's note with No. 616 states that the hymenial surface was pinkish when fresh. In No. 333 it is said to be orange, and the upper surface of the pileus white, tinged orange.

This species is common in the West Indies and South America and has often been referred to *Fomes lignosus* (Kl.). There is, however, some doubt as to the correctness of this identification with the Eastern species. There is no doubt as to the agreement of these specimens with the type of *F. microporus,* and this name antedates Montagne's *Polyporus Auberianus.*

F. marmoratus (*B. et C.*) *Cooke* in Grevillea **14,** 18 (1885).

On trunk of dead *Licania buxifolia* in dark Wallaba forest, Moraballi Creek, October 7, 1929, *Richards* 530 ; on dead stump of tree in second-growth forest, island in Essequibo River, October 14, 1929, *Richards* 562 ; on dead log, Moraballi Creek, October 21, 1929, *Richards* 659 p.p. (mixed with *Ganoderma applanatum* var. *tornatum*).

F. pseudosenex (*Murr*). *Sacc. et Trott.* Syll. Fung. **21,** 292 (1912).

On dead trunk, 20 feet above ground, in mixed forest, Moraballi Creek, October 17, 1929, *Richards* 605 ; on branch of small tree,

Moraballi Creek, November 1929, *Richards* 856 ; at base of Mora, Moraballi Creek, October 1929, *Richards* 613 ; on dead log in Wallaba forest, Moraballi Creek, October 19, 1929, *Richards* 618.

No. 605 is a very large specimen. No. 618 is small and evidently young, but still shows four layers of pores.

F. roseo-cinereus (*Murr.*) *Sacc. et Trott.* Syll. Fung. **21,** 291 (1912).

On dead Mora trunk, 8 feet above the ground, Moraballi Creek, October 16, 1929, *Richards* 574 ; inside rotted base of fallen tree, Moraballi Creek, October 16, 1929, *Richards* 593 ; on fallen trunk, Moraballi Creek, October 1929, *Richards* 611.

No. 593 includes both ungulate and resupinate forms, while No. 574 is applanate. No. 611 is in part resupinate and is darker in colour than usual. No. 593 has occasional setae (rare) and No. 574 none. The species was described as having no setae, and a specimen from Costa Rica, determined by Murrill, at New York, has none, but in the type gathering abundant setae are present. Flat specimens suggest *F. linteus*, but differ in the larger, usually greyish pores, and in the larger spores, which vary from hyaline to brown.

The fungus appears to cause a brown rot of the wood of the host.

F. tropicalis *Cooke* in Grevillea **15,** 22 (1886).

On the buttresses of a tree, Supenaam Creek, March 1931, *Martyn* 358.

Polystictus luteo-nitidus (*Berk.*) *Cooke* in Grevillea **14,** 77 (1886).

Among dead leaves on the ground, north of Tinamu Fall, Cuyuni River, March 10, 1931, *Martyn* 322.

P. gallinaceus (*Berk. et Cooke*) *Cooke* in Grevillea **14,** 78 (1886).

On fallen log in mixed forest, Moraballi Creek, September 25, 1929, *Richards* 458 ; on dead wood, Moraballi Creek, October 25, 1929, *Richards* 682 ; on log, Moraballi Creek, October 26, 1929, *Richards* 696 ; Pomeroon River, September 1904, *Bartlett* 8081 ; without precise localities, September-October 1904, *Bartlett* 8420, 8421, 8422, 8424 ; Tinamu Fall, Cuyuni River, October 1904, *Bartlett* 8433 ; among dead leaves on sandy soil, in mixed forest, north of Tinamu Fall, March 8, 1931, *Martyn* 307 ; on dead log, north of Tinamu Fall, March 10, 1931, *Martyn* 321 (?).

This species, which is evidently common in British Guiana, occurs also in Brazil, and has usually been referred to *P. mutabilis* B. et C. The original gatherings of *P. mutabilis* were from North Carolina, and examination of these has shown that this South American form is not the same. The confusion appears to have originated with Berkeley himself, who referred a specimen from Rio Negro (*Spruce* 176) to his *P. mutabilis*. Lloyd has continued the confusion, the figure he gives in his " Stipitate Polyporoids " for *P. mutabilis* being in reality a photograph of one of the original

gatherings of *P. gallinaceus*. *P. gallinaceus* differs from *P. mutabilis* in its very regular, spathulate shape, thinner substance, and darker, grey-zoned pileus. The fine striation on the pileus gives it a slightly silky appearance. The stem and base of the pileus is at first distinctly velvety, and the pores are very minute, smaller and shallower than those of *P. mutabilis*. The spores are hyaline, globose or subglobose, 3·5–4μ in diameter, whereas those of P. *mutabilis* are elliptical and about $5 \times 3\mu$.

No. 321, if rightly referred here, is a very dark form, more irregular in shape than usual. The collector's note states that in these specimens the upper surface of the pileus was blackish when fresh, but the hymenium white.

P. polygrammus (*Berk. et Curt.*) *Cooke* in Grevillea **14,** 78 (1886).

On dead log, Moraballi Creek, October 21, 1929, *Richards* 655.

The type is represented by one specimen only, and differs in some respects. These specimens grew in groups of two or three pilei, having the short stems united towards the base. According to the collector's notes the colour when fresh is white ; the dried specimens are yellowish. The stem and basal part of the pileus is distinctly hairy when seen under a lens, as in some species of *Favolus*; in fact, but for the minute pores the species suggests *Favolus*. The spores are hyaline, $4 \times 2–2·5\mu$.

Polystictus substereinus (*Murr.*) *Wakef.* comb. nov. *Polyporus subterraneus* (Murr.) Sacc. et Trott. (sic !) in Sacc. Syll. Fung. **21,** 276 (1912).

On dead log, Moraballi Creek, October 16, 1929, *Richards* 586.

It is possible that this is synonymous with *P. caryophyllaceus* B. et C. ex Cooke, but the type of that species is so inadequate that it is impossible to be certain of its identity. The resemblance to a *Stereum* is very striking. The species is close to *P. stereinus* B. et C., but thinner and lighter in colour, and with more distinct zones on the pileus.

P. modestus (*Kunze*) *Fr.* Nov. Symb. in Nova Acta Sci., ser. 3, **1,** 74 (1851). *P. albo-cervinus* Berk. in Hook. Journ. Bot. **8,** 234 (1856).

On rotten wood in dark rain-forest, Moraballi Creek, August 16, 1929, *Richards* 43 ; on fallen tree in Morabukea forest, Moraballi Creek, September 6, 1929, *Richards* 337 ; Moraballi Creek, October 20, 1929, *Richards* 636 ; on small Mora trunk, Supenaam Forest Reserve, Bartica, August 13, 1930, *Martyn* 203 ; Pomeroon River, September 1904, *Bartlett* 7950 ; without precise localities, *Bartlett* 7928, and in Herb. Kew.

P. sanguineus (*Linn.*) *Fr.* Nov. Symb. in Nova Acta Sci., ser. 3, **1,** 75 (1851).

Common on dead wood. Moraballi Creek, October 4, 1929, *Richards* 517 ; October 19, 1929, *Richards* 631 ; Lama, April 1887,

Jenman 3794 ; without precise localities, *Jenman* 7032, *Bartlett* 7929, 7978, *Meyer* (Esseq. 304 : 1818), *Schomburgk* (Brit. Guiana 3, 869) ; Mazaruni River, October 1923, *Altson* 43 ; Weri-Werai-Kam Creek, Essequibo, August 1930, *Martyn* 198.

P. trichomallus (*Berk. et Mont.*) *Fr.* Nov. Symb. in Nova Acta Sci. ser. 3, **1**, 78 (1851).

On dead log in Wallaba forest, Moraballi Creek, October 19, 1929, *Richards* 619 ; Upper Demerara River, September 1887, *Jenman* 4097 ; Pomeroon River, *Bartlett* 8684 ; without precise locality, in Herb. Kew (see Cooke in Grevillea **13**, 33,: 1884).

P. versatilis (*Berk.*) *Fr.* Nov. Symb. in Nova Acta Sci. ser 3, **1** 92 (1851).

On rotting wood of a fence post, Botanic Gardens, Georgetown, July 1929, *Martyn* 74.

When fresh this fungus was dark purple throughout. The dried specimens are brownish, and somewhat darker in colour than the majority of specimens from the East, where the species is more common.

P. pinsitus *Fr.* Nov. Symb. in Nova Acta Sci. ser 3, **1**, 86 (1851) ; Epicr. 479 (1836-38).

On dead log, Moraballi Creek, October 16, 1929, *Richards* 579 ; on dead twig, Mabaruma, North Western District, November 1928, *Martyn* 5.

These specimens have smaller pores than usual. I have collected a similar form in the West Indies.

P. vinosus (*Berk.*) *Cooke* in Grevillea **15**, 51 (1886).

On small dead tree in Mora forest, Moraballi Creek, September 12, 1929, *Richards* 372 ; Pomeroon River, September 1904, *Bartlett* 8434, 8435 ; Cuyuni River, October 1904, *Bartlett* 8269, 8305 ; Tinamu Fall, Cuyuni River, October 1904, *Bartlett* 8432 ; Aruka River, October 1905, *Bartlett* 8610.

P. licnoides (*Mont.*) *Fr.* Nov. Symb. in Nova Acta Sci. ser. 3, **1**, 92 (1851).

On bark of dead Morabukea (*Mora Gonggrijpii*) in virgin forest, Moraballi Creek, August 13, 1929, *Richards* 2 ; on dead logs, October 17, 1929, *Richards* 615 ; October 25, 1929, *Richards* 684, 686 ; on dead wood in second-growth forest, First Falls of Essequibo River, October 14, 1929, *Richards* 565 ; on dead stump in mixed forest, Mabaruma, North-Western District, April 1929, *Martyn* 29.

P. aculeans (*Berk.*) *Cooke* in Grevillea **14**, 86 (1886).

On rotting trunk of *Licania* sp., Moraballi Creek, September 25, 1929, *Richards* 456.

The species is allied to *P. caperatus*, of which it may be a form. It differs in the less pubescent, radiately ridged and aculeate surface, and the usually whitish hymenium.

P. caperatus (*Berk.*) *Fr.* Nov. Symb. in Nova Acta Sci. ser. 3, **1,** 92 (1851).

On fallen trunk, Moraballi Creek, August 21, 1929, *Richards* 138 ; on small dead tree in undergrowth of Greenheart forest, Moraballi Creek, October 11, 1929, *Richards* 546 (resupinate form) ; on log, Moraballi Creek, October 16, 1929, *Richards* 581 ; on log in Wallaba forest, October 19, 1929, *Richards* 629 ; on dead standing trunk, Moraballi Creek, October 25, 1929, *Richards* 679 ; Cuyuni River, October 1904, *Bartlett* 8085 ; north of Tinamu Fall, Cuyuni River, March 10, 1931, *Martyn* 320 ; without precise locality (resupinate form) in Herb. Berk.

P. Sector (*Ehrenb.*) *Cooke* in Grevillea **14,** 86 (1886).

Common. On old logs, Morabukea forest, Moraballi Creek, August 31, 1929, *Richards* 289 ; on rotting trunk of *Licania* sp., Moraballi Creek, September 25, 1929, *Richards* 455 ; on bark of tree, in Wallaba forest, Moraballi Creek, October 11, 1929, *Richards* 545 ; on dead log, Moraballi Creek, October 1929, *Richards* 609.

P. membranaceus (*Sw.*) *Fr.* Nov. Symb. in Nova Acta Sci. ser. 3, **1,** 93 (1851). *Polyporus Flabellum* Mont. in Ramon de la Sagra, Hist. Cuba (Pl. Cell.), 388 (1845).

On dead log in Wallaba forest, Moraballi Creek, October 19, 1929, *Richards* 637 ; October 23, 1929, *Richards* 662.

Poria carneopallens (*Berk.*) *Cooke* in Grevillea **14,** 110 (1886).

On damp, rotting log near Tinamu Fall, Cuyuni River, March 5, 1931, *Martyn* 287.

Distinguished by its colour (pale orange when fresh), reflexed margin, and horny consistency when dry. Encrusted cystidia and clusters of crystals are present in the tissue.

P. cruentata (*Mont.*) *Cooke* in Grevillea **14,** 110 (1886).

On trunk of small dead tree in undergrowth of Morabukea forest, Moraballi Creek, November 1, 1929, *Richards* 723.

The colour when fresh is described as " flame-colour with orange border." When dry the species bears a close resemblance to *Poria taxicola*. The material has been compared with the type at Paris, and it is now clear that the species is a good one and not a resupinate form of *Polyporus dichrous* Fr., as has been suggested.

P. epimiltina (*Berk.*) *Lloyd*, Myc. Notes **6,** 63, 969 (1920).

On dead stump, Moraballi Creek, October 16, 1929, *Richards* 592.

Trametes corrugata (*Pers.*) *Bres.* in Hedwigia **51,** 316 (1912). *Polystictus Persoonii* Fr. ex Cooke in Grevillea 14, 85 (1886).

Very common on dead logs. Moraballi Creek, October 16, 1929, *Richards* 573 ; in Wallaba forest, October 19, 1929, *Richards* 617 ; First Falls of Essequibo River, October 14, 1929, *Richards* 614 ; Lookout, Essequibo River, July 1923, *Altson* 139 ; without precise locality, *Bartlett* 8305.

T. hydnoides (*Sw.*) *Fr.* Epicr. 490 (1836-38).

General in forests. On fallen branches of *Pithecolobium Saman*, Botanic Gardens, Georgetown, November 1929, *Martyn* 166 ; Botanic Gardens, Georgetown, May 1924, *Altson* 141 ; Lama, April 1887, *Jenman* 3793 ; without precise localities, June 1893, *Jenman* 6507, in Herb. Dept. Agric. Brit. Guiana, and *Schomburgk* (Brit. Guiana 3, 870).

Hexagonia Bartlettii *Mass.* in Kew Bull. 1908, 216.

On small branch at top of Morabukea tree (*Mora Gonggrijpii*) (140 ft.), Moraballi Creek, October 17, 1929, *Richards* 639 ; on dead branch, probably from felled tree, Moraballi Creek, October 21, 1929, *Richards* 657 ; Botanic Gardens, Georgetown, *Bartlett* 8701 (type).

Daedalea Sprucei *Berk.* in Hook. Journ. Bot. **8**, 236 (1856).

On dead bark of living *Cassia pteridifolia* Sandw. in dry, well-lit forest, Moraballi Creek, September 23, 1929, *Richards* 426 ; Rockstone, June 1904, *Bartlett* 7919 ; Cuyuni River, October 1904, *Bartlett* 8431 ; without precise locality, in Herb. Kew (Cooke in Grevillea 13, 33 : 1884).

Favolus melanopus *Mont.* in Ann. sci. nat. sér. 4, **1**, 136 (1854).

On dead log in Morabukea forest, Moraballi Creek, October 20th, 1929, *Richards* 624.

The species resembles closely *Polyporus guianensis* Mont., but differs in the smooth, non-striate pileus and darker and more rigid pore-walls.

Gloeoporus conchoides *Mont.* in Ramon de La Sagra, Hist. Cuba (Pl. Cell.), 385 (1845).

140 ft. above ground on branch of *Mora Gonggrijpii*, October 20, 1929, *Richards* 652 ; without precise locality, in Herb. W. J. Hooker, Kew.

Irpex griseo-fuscus *Mont.* in Ann. sci. nat. sér. 4, **1**, 137 (1854).

On bark of dead *Mora* sp., Moraballi Creek, August 13, 1929, *Richards* 1 ; on stump in swampy *Mora* Forest, August 22, 1929, *Richards* 179 ; on dead log in dry, well-lit forest, Moraballi Creek, September 16, 1929, *Richards* 383 ; on dead log, Moraballi Creek, October 16, 1929, *Richards* 578 ; on log in Wallaba Forest, October 19, 1929, *Richards* 625.

Forming large colonies on fallen trees, apparently common.

Lenzites Palisoti *Fr.* Epicr. 404 (1836-38). *L. repanda* (Pers.) Fr. Epicr. 404 (1836-38).

Common on dead logs, Moraballi Creek, October 16, 1929, *Richards* 584, 585 ; Bartica, April 1887, *Jenman* 3890 ; August 1893, *Jenman* 6828.

The species varies as to hymenial form, No. 585 being poroid. *Jenman* 6828 (in the herbarium of the British Guiana Department of Agriculture) consists of brownish specimens, probably discoloured by poison.

L. striata (*Sw.*) *Fr.* Epicr. 404 (1836-38).

On dead log, Mabaruma, North-Western District, November 1928, *Martyn* 13 ; Suddie, July 1905, *Bartlett* 7942 ; on posts, coast region, April 1892, *Jenman* 6423.

Cladoderris dendritica *Pers.* ex Fr. Fung. Nat. in K. Vet. Ak. Handl. Stockholm, 142 (1848).

On dead log, Moraballi Creek, October 16, 1929, *Richards* 580 ; Botanic Gardens, Georgetown, November 1907, *Bartlett* 8714 ; without precise locality, October 1894, *Jenman* 6830.

Hypolyssus Montagnei *Berk.* in Hook. Lond. Journ. Bot. **1,** 139 (1842).

Common on dead sticks, especially in well-lit forest, Moraballi Creek, October 12, 1929, *Richards* 550 ; November 1, 1929, *Richards* 730 ; Pomeroon River, September 1904, *Bartlett* 8019.

Stereum hydrophorum *Berk.* in Ann. & Mag. Nat. Hist. **14,** 327 (1844).

On rotten log in low, sandy forest, Moraballi Creek, September 17, 1929, *Richards* 387 ; on dead logs, Moraballi Creek, October 1929, *Richards* 606, 607 (very young specimens).

A note accompanying the specimens states that when found the cups were filled with water containing mosquito larvæ and water-beetles, and that in such cases the fibrils grew out from the pileus into the water.

S. australe *Lloyd,* Mycological Writings, Letter No. 48, 10 (1913).

On dead log in Wallaba forest, Moraballi Creek, October 19, 1929, *Richards* 630 ; on log in mixed forest, Mabaruma, North-Western District, November 1928, *Martyn* 11.

Hymenochaete damaecornis (*Link*) *Lév.* in Ann. sci. nat. sér. 3, **5,** 151 (1846).

Among dead leaves in mixed forest, Moraballi Creek, October 23, 1929, *Richards* 663 (young specimen) ; Mabaruma, North-Western District, November 1928, *Martyn* 8, p.p.; on decayed wood, Thururu Tributary, Upper Pomeroon River, July 1906, *Bartlett* 8627 ; Cuyuni River, October 1904, *Bartlett* 8270.

H. luteobadia (*Fr.*) *Wakef.* in Kew Bull. 1917, 13. *H. laeta* Berk. ex Cooke in Grevillea **8,** 146 (1880).

On fallen branch, Moraballi Creek, September 5, 1929, *Richards* 331 ; October 1929, *Richards* 610 ; Supenaam Forest Survey Camp 3, Bartica, August 17, 1930, *Martyn* 216 ; North of Tinamu Fall, Cuyuni River, March 10, 1931, *Martyn* 327 ; without precise locality, *Schomburgk.*

Auricularia mesenterica (*Dicks.*) *Fr.* Epicr. 535 (1836-38).

On dead wood in second-growth forest, First Falls of Essequibo, October 14, 1929, *Richards* 563.

A. polytricha (*Mont.*) Sacc. Misc. Myc. 1 in Atti d. R. Istit. Veneto di sci., ser. 6, **2,** (1884).

Supenaam Forest Survey, Bartica, August 1930, *Martyn* 205 ; without precise locality, *Schomburgk* in Herb. W. J. Hooker (Kew.)

A. delicata (*Fr.*) *Lloyd,* Mycological Writings, Letter 66, 9 (1917). *A. tremellosa* (Fr.) Petch in Ann. Roy. Bot. Gard. Peradeniya, **5,** 414 (1910).

On fallen log, Moraballi Creek, November 13, 1929, *Richards* 833.

Iola Hookerianum *Moell.* in Schimper, Bot. Mitt. aus den Tropen, **8,** 24 and 163 (1895).

On calyptras of a moss, on log in moist, fairly well-lit forest, Moraballi Creek, September 26, 1929, *Richards* 226.

Neotyphula *Wakef.* gen. nov.

Sporophora tenella, stipitata, haud gelatinosa, stipite filiformi atro, a clavula distincto, clavula cylindrica vel inaequilaterali, simplici vel rarius bifurcata. Hymenium laeve, pulverulentum. Basidia transverse septata, sterigmatibus lateralibus 3–4. Sporae hyalinae.

N. guianensis *Wakef.* sp. nov.

Sporophora gregaria, stipitata, anguste typhuloidea, 1–1·2 cm. alta. Stipes ater, glaber, compresso-filiformis, 4–7 mm. circiter longus, in clavulam ut columella productus. Clavula cylindrica vel saepe unilateralis, 0·5-0·75 cm. circiter longa, ad 1 mm. crassa, viva grisea, siccitate plus minus avellanea, spongiosa, pulverulenta. Hyphae stipitis rectae, subrigidae fuscidulae, 2·5–3μ ; hyphae subhymeniales pallidae, flexuosae, 2μ diametro. Basidia curvata, 3·4-septata, hyalina, 35–50×7–8μ ; sterigmata 5–8 (–10)×2μ. Sporae (si genuinae) hyalinae, oblongae, uno latere depressae, 8–10 (–12)× 4–5μ.

Hab. Ad truncos emortuos, Moraballi Creek, Guiana Anglica, August 21, 1929, *Richards* 139.

This very distinctive fungus was found at the end of the rainy season in the drier Wallaba forest, forming an extensive colony on a fallen rotting tree-trunk. The genus differs from *Eocronartium* Atk.

in the distinct black stem, which is continued to the top of the club as a columella, in the spongy (not gelatinous) texture of the club, and in not being parasitic on mosses. In *N. guianensis* the club is frequently developed on one side of the stem only, with the result that the plants on drying tend to curl spirally inwards as the hymenium contracts. (See fig. 1, A). Unfortunately the spores had been shed and only a very few detached spores were seen. These however are undoubtedly Basidiomycetous, as seen from the figure, and they probably belong to this fungus.

Tremella fuciformis *Berk.* in Hook. Journ. Bot. **8**, 277 (1856).
On dead log, Moraballi Creek, October 16, 1929, *Richards* 588.

Guepinia spathularia (*Schw.*) *Fr.* Elench. **2**, 32 (1828).
On charred dead branch, Mabaruma, North-Western District, November 1928, *Martyn* 6.

Fig. 1. *Neotyphula guianensis* Wakef. A. Habit (x2); B. One young and two mature basidia (x1100); C. Spores (x1100).

GASTEROMYCETES.

Dictyophora indusiata (*Vent.*) *Fischer* in Sarasin et Roux, Nova Caledonia **1**, part 1, 3 (1914).
On a bush-rope coiling round a tree, about 10 feet from ground, Moraballi Creek, October 26, 1929, *Sandwith* (noted only); without precise locality,—June 1897, *Jenman* 7263; September 1904, *Bartlett* 7878.

Cyathus limbatus *Tul.* in Ann. sci. nat. sér. 3, **1**, 78 (1844).

On soil of disused seed-box, Botanic Gardens, Georgetown, August 1933, *Martyn* 404 ; without precise locality, in Herb. Hooker, Kew.

Geaster mirabilis *Mont.* in Ann. sci. nat. sér. 4, **3,** 139 (1855).

On rotting twigs on floor of shady forest, Moraballi Creek, September 6, 1929, *Richards* 336.

USTILAGINEAE.

Spacelotheca cordobensis (*Speg.*) *Jackson* in Journ. Dept. Agr. Porto Rico **14,** 298 (1930). *S. Panici-leucophaei* (Bref.) Clinton in North Amer. Flora **7,** 28 (1906.)

On *Panicum geminatum* Forsk., Botanic Gardens, Georgetown, December 1929, *Martyn* 190.

PYRENOMYCETES.

Xylaria obovata *Berk.* in Journ. Linn. Soc. **10,** 380 (1860).

On dead twig in mixed forest, Upper Arawan River, Aruka River, North Western District, May 1929, *Martyn* 50.

X. anisopleura *Mont.* in Ann. sci. nat. sér. 2, 13, 348 (1840).

On dead branches on the ground, Moraballi Creek, October 16, 1929, *Richards* 575.

The specimens have not yet formed ascospores, but there is little doubt that they belong to this species.

X. dealbata *Berk. et Curt.* in Journ. Acad. Nat. Sci. Philadelphia, New Ser., **2,** 284 (1853).

On dead rotting log in mixed forest, Upper Arawan River, North-Western District, May 1929, *Martyn* 45.

X. Telfairii (*Berk.*) *Sacc.* Syll. Fung. **1,** 320 (1882). *X. involuta* (Kl.) Cooke in Grevillea **11,** 82 (1883).
X. tabacina (Kickx) Berk. in Hook. Journ Bot. **6,** 225 (1854).

On dead log, Moraballi Creek, October 19, 1929, *Richards* 634, 635.

X. biceps *Speg.* var. **microsperma** *Speg.*, Fung. Guar., Pug. 1, 86 (1883).

On dead log, Moraballi Creek, October 23, 1929, *Richards* 660.
Spores $8 \times 3{\cdot}5\mu$.

Camillea Leprieurii *Mont.* in Ann. sci. nat. sér. 4, **3,** 112 (1855).

On branch of fallen tree in clearing, Moraballi Creek, September 4, 1929, *Richards* 324 ; on branch of small dead tree in dry, well-lit Wallaba forest, Moraballi Creek, September 28, 1929, *Richards* 488.

The collector's note with No. 488 states that it had a peculiar smell when fresh.

C. mucronata *Mont.* in Ann. sci. nat. sér. 4, **3,** 112 (1855).

A large colony, covering whole log, in Greenheart bush, left bank of Cuyuni River, Stop-off Fall, March 1, 1931, *Martyn* 255.

C. Cyclops *Mont.* in Ann. sci. nat. sér. 4, **3**, 113 (1855).
On bark, Ananda-basu Creek, 1929, *Altson* 461.

C. poculiformis (*Kunze*) *Lloyd*, Syn. Large Pyrenomycetes, 9 (1917).
On dead logs and on standing dead tree-trunk in mixed forest, October 25, 1929, *Richards* 676, 677 ; November 6, 1929, *Richards* 759 ; Pomeroon River, September 1904, *Bartlett* 8696 (determined wrongly as " *Hypoxylon turbinatum* ").
In No. 677 the stromata are almost sessile, as in *C. globosa*, whereas in No. 676 the stalks are comparatively long.

Hypoxylon areolatum *B. et C.* in Journ. Linn. Soc. **10**, 384 (1869). *Penzigia macrospora* Penz. et Sacc. in Malpighia 11, 494 (1897).
On dead log in Wallaba forest, Moraballi Creek, October 23, 1929, *Richards* 661.

H. lucidulum *Mont.* in Ann. sci. nat. sér. 2, **13**, 354 (1840).
At base of dead, standing trunk, Moraballi Creek, October 25, 1929, *Richards* 685.

H. pavimentosum *Ces.* Mycet. it. Born. 18 (1879).
On dead log, Moraballi Creek, October 1929, *Richards* 649.
Varying from small rounded stromata which suggest *Kretzschmaria* to more effused crusts due to coalescence. The abrupt, vertically cut margin of the stroma is characteristic.

H. stygium (*Lév.*) *Sacc.* Syll. Fung. **1**, 379 (1882).
On rotten stick on floor of Wallaba forest, Moraballi Creek, October 11, 1929, *Richards* 543.
Probably this species, but the specimen is without spores.

H. annulatum (*Schw.*) *Mont.* in Gay, Fl. Chil. **7**, 445 (1850).
On bark of felled tree in clearing, Moraballi Creek, October 30, 1929, *Richards* 707.

H. rubigineo-areolatum *Rehm.* var. **Bakeri** (*Earle*) *Miller* in Journ. Dept. Agric. Porto Rico **14**, 273 (1930).
On dead tree in second-growth forest, First Falls of Essequibo, October 14, 1929, *Richards* 564.

Kretzschmaria Clavus *Fr.* Summ. Veg. Scand. 409 (1846).
On standing mossy trunk, Moraballi Creek, October 1929, *Richards* 608 ; on bark at foot of *Mora Gonggrijpii*, Moraballi Creek, October 1929, *Richards* 642.

Nummularia Baileyi (*B. et Br.*) *Cooke* in Grevillea **12**, 6 (1883).
On under side of dead branch, Moraballi Creek, October 16, 1929, *Richards* 577.

Seynesia erumpens (*B. et C.*) *Petrak* in Ann. Myc. **25**, 339 (1927).

On dead palm rachis in swamp, north of Tinamu Fall, Cuyuni River, March 7, 1931, *Martyn* 296.

The mucilaginous appendages of the spores described by Sydow (as *Steganopycnis oncospermatis*) and Petrak are well shown in these specimens.

Micropeltella constricta *Stev. et Manter* in Bot. Gaz. **79**, 281 (1925).

Associated with *Dictyothyriella guianensis* on leaves of seedling *Licania buxifolia* Sandw. in undergrowth of Wallaba forest, Moraballi Creek, October 11, 1929, *Richards* 549 p.p.; on leaves of *Duguetia neglecta* Sandw., Moraballi Creek, October 1929, *Richards* 555 p.p.; on unknown *Anonaceae*, Kartabo, July 22, 1922, *Stevens* 568 (type).

Dictyothyriella guianensis *Stev. et Manter* in Bot. Gaz. **79**, 274 (1925).

On leaves of various trees and shrubs in rain forest, Moraballi Creek, September 3, 1929, *Richards* 295; on leaves of seedling *Licania buxifolia* Sandw., in undergrowth of Wallaba forest, Moraballi Creek, October 11, 1929, *Richards* 549 p.p.; on *Costus* sp., Rockstone, July 16, 1922, *Stevens* 1005; on *Pesequeria latifolia*, Kartabo, July 22, 1922, *Stevens* 534; on *Philodendron* sp., Kartabo, July 23, 1922, *Stevens* 1006; on *Licania*, *Tabernaemontana* and *Bauhinia* sp., Rockstone, July 17, 1922, *Stevens* 479, 473, 469; on unknown *Marantaceae*, July 21, 1922, *Stevens* 505; on unknown *Apocynaceae*, Tumatumari, July 11, 1922, *Stevens* 163; on unknown hosts, Kartabo, July 17-23, 1922, *Stevens* 530, 606, 608; Tumatumari, July 8-11, 1922, *Stevens* 993, 155; Wismar, July 14, 1922, *Stevens* 275.

DISCOMYCETES.

Cookeina Tricholoma (*Mont.*) *Kuntze*, Rev. Gen. Pl. **2**, 849 (1891).

On twig on floor of mixed rain-forest, Moraballi Creek, August 22, 1929, *Richards* 173; October 20, 1929, *Richards* 651; Supenaam Forest Reserve, near Bartica, August 13, 1930, *Martyn* 208.

Polydiscidium *Wakef.* gen. nov.

Ascomata gelatinosa, caespitosa, erecta, ramosa. Apothecia in ramulis terminalia, parva, planiuscula. Asci cylindraceo-clavati, paraphysati, paraphysibus mucoso-cohaerentibus. Sporae octonae, monostichae, ellipticae, fuscidae, uniseptatae.

P. Martynii *Wakef.* sp. nov.

Ascomata gelatinosa, caespitosa, 8 mm. circiter alta, atro-purpurea, siccitate fusca, rugosa, ramosa, ramulis ultimis brevissimis, teretiusculis. Hyphae contextus pallidae, 2–3μ diametro, hinc inde prope septa ad 10μ inflatae, laxe intertextae, mucoso obvolutae, marginem versus in cellulas brunneas, plus minus

elongato-subquadratas transformatae. Apothecia atro-pupurea, terminalia, minuta, vix 1 mm. diametro, planiuscula, interdum compressione undulata. Asci cylindracei, 40–45×4·5–5μ, octospori. Paraphyses numerosae, hyalinae, filiformes, sursum paullulum incrassatae, mucoso-cohaerentes, ascos aequantes. Sporae monostichae, ellipticae, fuscidulae, 7–8×3–4μ, uniseptatae, ad septa non constrictae.

Hab. in ligno putrido, Upper Arawan River, Guiana Anglica, *Martyn* 43, May 1929.

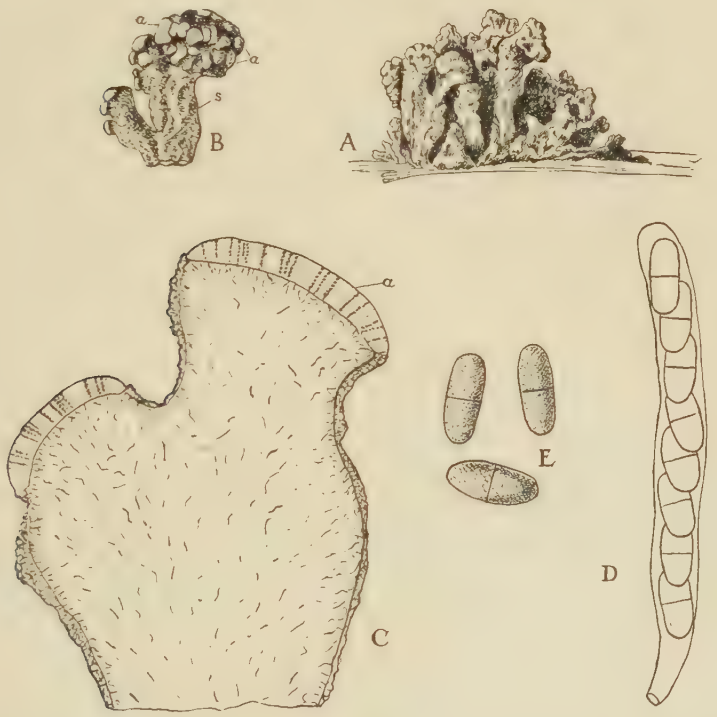

Fig. 2. *Polydiscidium Martynii* Wakef. A. Habit (x2); B. Tip of branch of ascoma enlarged; *a*, apothecia, *s*, stalk; C. Vertical section showing two apothecia (much magnified); D. Ascus (x1500); E. Spores (x1800).

This fungus is remarkable in habit, consisting of a branched gelatinous body somewhat resembling the conidial stage of *Coryne sarcoides*, but bearing numerous disks. In the above technical description the whole structure has been designated the ascoma, and each separate disk as an apothecium. The material is unfortunately very scanty, but there is no doubt that this habit is one quite different from that of most of the cup-fungi: it is suggestive rather of a fruticose lichen, but no trace of lichen-gonidia has been

found. The two celled brown spores are also unusual in the group. *Sorokina* Sacc. has similar spores, but differs in the simple, sessile ascophore.

FUNGI IMPERFECTI.

Phyllosticta Turconii *Trinch.* in Sacc. Syll. Fung. **22**, 863 (1913).

On leaves of *Philodendron Demerarae* Gleason, First Falls of Essequibo River, October 14, 1929, *Richards* 567.

Rhizomorpha corynephora *Kunze* in Weig. Exs.; Berk. in Hook. Journ. **8**, 277 (1856).

On twigs in undergrowth of Greenheart forest, Moraballi Creek, September 14, 1929, *Richards* 379 ; on living twig of Anonaceous tree, Moraballi Creek, September 15, 1929, *Richards* 380 ; on skeleton leaf hanging from twig of small Anonaceous tree in forest undergrowth, Moraballi Creek, October 1929, *Richards* 531 ; Upper Arawan River, May 1929, *Martyn* 44 ; Kykoverall, Essequibo River, October 1904, *Bartlett* 8297 ; Cuyuni River, October 1904, *Bartlett* 8093 ; North Western District, November 1915, in Herb. Dept. Agr. Brit. Guiana.

This curious growth is apparently common in the forest undergrowth, but no fruit has so far been found.

XXXI—DECADES KEWENSES PLANTARUM NOVARUM IN HERBARIO HORTI REGII CONSERVATARUM. DECAS CXXXI.

1301. **Pelargonium** (**Hoarea**) **Fergusoniae** *L. Bolus* [Geraniaceae] ; *P. attenuato* Harv. affine, ut videtur, sed indumento setoso, haud strigoso, petiolis subflexuosis, in plantis feris 3–5·5 cm. longis, foliorum lobis ultimis vix longis angustisque.

Folia 1–2, hysterantha, orbicularia, setosa, demum fere glabra, ad 6 cm. diametro, palmate 3-partita, partibus irregulariter 1–3-pinnatipartitis, segmentis ultimis linearibus vel oblongis vel oblongo-ovatis acutis 1–7 mm. longis 1–2 mm. latis. *Pedunculus* subflexuosus, saepius 5–10 cm. longus. *Inflorescentia* ramosa, ramis ad 8–fl., floribus 6–8 eodem tempore expansis. *Bracteae* lanceolatae, acuminatae, 2·5 mm. longae. *Pedicelli* cum calcare aequilongo ad 3 cm. longi. *Sepala* e parum infra medium recurvata, posteriore semper erecto, linearia, acuminata, 0·8–1 cm. longa, basi 1–1·5 mm. lata, cum pedicello parce pubescentia, pilis adpressis, pilis glanduliferis patentibus inconspicuis interjectis. *Petala* 5, straminea, obtusa vel subacuta, marginibus undulatis, anteriora 3 e basi vel parum supra laxe patentia, inferne inconspicue lineata, ad 2·6 cm. longa, 1·5–2 mm. lata, posteriora dimidio inferiore erecta et contigua ibique stamina subvaginantia, dimidio superiore demum recurvata et divergentia, lamina latere altero (exteriore) leviter ampliata, inferne lineis prope medium nota, rubicunde ornata, ad 3 cm. longa, ad 3 mm. lata, ungue 4 mm. longo. *Stamina* 5 antherifera, filamentis 2–5 mm., staminodiis ad 3 mm. longis, antheris purpureis, polline aurantiaco.

Ovarium sericeum, 2 mm. longum, stylo 3 mm., stigmatibus 2 mm. longis.

South Africa. Cape Province: near Riversdale, May 1932, *L. Bolus & E. Ferguson* (Bolus Herbarium, no. 20512). Flowered in cultivation Nov.–Dec.

1302. **Centella lanata** *R. H. Compton* [Umbelliferae]; affinis *C. erianthae* Drude, sed habitu robustiore, caulibus et foliorum paginis copiose albo-lanatis marginibus crebrius serratis differt.

Suffrutex vagans, intricatus, internodiis elongatis, nodis non radicans, caulibus et petiolis et laminis utrimque dense albo-lanatis demum glabrescentibus. *Caules* graciles, teretes, striati, parum rigidi, internodiis 2·5-7·5 cm. longis, foliis pedunculisque fasciculatis. *Petiolus* gracilis, ad 5 cm. longus, basi scarioso-amplexicaulis; lamina firma, herbacea, orbiculato-cordata vel reniformis, 1·6–2·4 cm. longa, 2–3·2 cm. lata, venis palmatis, margine regulariter dentato, dentibus late triangulari-acutis 1 mm. longis 1·5–2 mm. latis. *Inflorescentiae* aliquae pedunculo maturo 1·6 mm. longo, bracteis involucralibus 2 late deltoideo-orbicularibus acuminatis 4 mm. longis 4 mm. latis, flore uno subsessili bisexuali, sepalis obsoletis, petalis subviridibus ovatis obtusis, fructu 2 mm. longo 1 mm. lato venis reticulatis; aliquae pedunculo breviore, bracteis involucralibus 4 ovatis acuminatis, floribus 5 masculis subsessilibus, stigmatibus rudimentariis.

South Africa. Cape Province: Knysna Division; Formosa Peak, south slope, 1400 m., 4 May 1933, *Compton* 4235.

Centella lanata is allied to *C. eriantha* Drude in general form, but is well distinguished by the copious white woolly clothing of stems and both leaf-surfaces, more robust growth, and finer serration of the leaf-margins. It agrees with *C. eriantha* in its polygamous inflorescences. (N.B. Sonder in Fl. Cap. **2**. 528 is in error in his statements on this subject.)

1303. **Stoebe Ensori** *R. H. Compton* [Compositae]; ab *S. capitata* Berg. bracteis exterioribus involucri pilosis, et ab *S. incana* Thunb. et *S. spirali* Less. bracteis floribus brevioribus bene distinguitur.

Suffrutex humilis, ramosus, expansus vel suberectus. *Caules* teretes, lanati, glabrescentes. *Folia* numerosa, sparsa, imbricata, torta, erecta vel subpatentia, sessilia, oblongo-lanceolata, acuta, mucronata, 2–6 mm. longa, 1–2 mm. lata, supra dense albo-lanata, infra laxe lanata. *Inflorescentia* globosa vel cylindrica, 2·5 cm. longa, 8–12 mm. diametro. *Bracteae involucrales* 2–3 mm. longae, linearilanceolatae, brunneo-scariosae, acuminatae, exteriores pilosae, interiores glabrae. *Corolla* 3 mm. longa, segmentis triangulatis acutis patentibus roseis. *Achaenia* minute puberula, annulo distincto. *Pappi setae* circiter 12, connatae, plumosae.

South Africa. Cape Province: Uniondale Division; Lauterwater (Long Kloof), dry hills, 750 m. 3 May 1933, *Compton* 4195.

Well distinguished from *S. capitata* Berg. by its pilose outer involucral scales, and from *S. incana* Thunb. and *S. spiralis* Less. by their length which is less than that of the flower. The foliage is also distinctive.

Named in compliment to Mr. R. W. Ensor of Appledale, Lauterwater, who pointed out the plant to me on his farm.

1304. **Lobelia valida** *L. Bolus* [Lobeliaceae] ; *L. triquetrae* affinis, sed foliis dissimilibus, floribus in racemis permultis majoribusque praecipue differt.

Planta erecta glabra vel partibus herbaceis rarius irregulariter parceque hispidis, e basi ramosa, 15–45 cm. alta. *Caulis* basi 5–8 mm. diametro, cum ramis foliosis 4-angulatus vel 4-altus ob bases decurrentes foliorum. *Folia* adscendentia vel fere erecta, oblongo-obovata, 4–10 cm. longa, 0·4–1·8 cm. lata., sessilia, apice rotundata vel subtruncata, irregulariter dentata vel rarius lobulata, sat crassa, saepissime levia politaque. *Pedunculus* 2–5 cm. longus. *Racemus* gradatim elongatus, 6–9 cm. longus vel ultra, floribus superioribus corymbose dispositis, eodem tempore 7–8 expansis. *Pedicelli* fere erecti, 0·5–1·5 cm. longi. *Bracteae* inferiores oblongae, utrinque 1–2 denticulatae, 7–8 mm. longae, superiores lineares, acutae, subintegrae. *Calycis tubus* obconicus, 10-costatus, 3 mm. longus, apice 3 mm. diam. *Sepala* lineari-lanceolata, acuminata, saepius 5–5·5 mm. longa. *Corolla* saturate caerulea, 1·7 cm. longa, tubo intus papillato apice callis 2 luteis ornato 9 mm. longo posteriore per 2 mm. coalito, labio anteriore ad 1·4 cm. lato dimidio inferiore nota alba late ornato fere ad dimidium vel parum ultra diviso, segmentis suborbicularibus minute apiculatis posterioribus subobovatis vel spathulato obovatis. *Antherae* 2 anteriores barbatae, 3 posteriores apicem versus externe hirsutae.

South Africa. Cape Province : Riversdale Division ; Still Bay, April 1909, *J. Muir*, 193 (National Herbarium no. 5106) ; Nov. 1929, *E. Ferguson* (National Botanic Gardens no. 391/32) ; Jan. 1931, *L. Bolus* (Bolus Herb. no. 19464, type).

1305. **Mandragora Shebbearei** *C. E. C. Fischer* [Solanaceae] ; a *M. caulescente* C. B. Clarke foliis anguste oblanceolatis, calyce tubuloso pilis glanduloso-capitatis parce instructo, corolla anguste infundibulari recedit.

Herba perennis ; caulis crassus, circiter 5 cm. longus, apice brevissime ramosus. *Folia* rosulata, subcoriacea, anguste oblanceolata, obtusa, decurrentia, 4–11 cm. longa, 1·5–3 cm. lata, nervis lateralibus utrinque 8–16 a costa crassa angulo lato ortis, marginibus undulatis ; petioli crassi, plani, usque 7 cm. longi. *Flores* numerosi, solitarii, axillares ; pedicelli graciles, 6-7 mm. longi, statu fructifero usque 2 cm. longi, pilis sparsis brevibus glanduloso-capitatis vestiti. *Calyx* subcarnosus, tubulosus, 8–9·5 mm longus, reticulato-venosus, extra pilis brevibus glanduloso-capitatis instructus ; lobi 5, lingulati,

obtusi, uno 2·7 mm. longo, reliquis 1·7 mm. longis. *Corolla* anguste infundibularis, 1·8 cm. longa; lobi rotundato-oblongi, obtusi, marginibus undulatis. *Stamina* 5, supra medium tubum inserta; filamenta gracilia, 3·5 mm. longa; antherae in fauce tubi, oblongae, 2 mm. longae. *Ovarium* globosum, 2·5 mm. diametro; stylus gracilis, circiter 4 mm. exsertus; stigma magnum, peltatum. *Capsula* glabra, circiter 1 cm. diametro, in calyce persistente inflato rigide cartilagineo valde reticulato-venoso 4 cm. longo fere 2 cm. diametro inclusa. *Semina* numerosa, subreniformia, compressa, 3·5 mm. longa, granulata.

Tibet. Tinkye-la, on the pass, 4800 m., July 1933, *E.O. Shebbeare* (Mount Everest Expedition) 102.

Only 1 or 2 flowers were present among many bladder-like fruiting calyces. The specimen was mouldy, so that it was difficult to separate the flowers from the surrounding foliage.

1306. **Struthiola Fourcadei** *R. H. Compton* [Thymelaeaceae]; tubi perianthii longitudine, foliis junioribus albo-sericeis, squamis 12 pilis longioribus obtectis conspicue distincta.

Frutex erectus, virgatus, ad 1 m. altus, parce ramosus. *Caules* teretes sericeo-villosi, demum glabrescentes, rigidi, foliorum cicatricibus prominentibus. *Folia* sparsa, imbricata, erecto-patentia, anguste lanceolata, 1–1·4 cm. longa, 2·5–3·5 mm. lata, acuta, marginibus leviter incurvatis, facie superiore laeve glabra, facie inferiore striata villis sericeis albis basi bulbosis, demum deciduis, ita superficie subpapillosa superante. *Flores* axillares, solitarii, numerosi. *Bractiolae* 4 mm. longae, lineari-lanceolatae, longitudinaliter plicatae, sericeo-villosae. *Perianthii tubus* 2·2–2·6 cm.longus, gracilis, supra parum dilatatus, albus, sericeo-villosus; lobi ovati, acuti, 4 mm. longi, 1·5 mm. lati, infra sericeo-villosi, supra glabri. *Squamae* 12, subulatae, erectae, flavae, 1·25 mm. longae, villis amplectentibus 2 mm. longis. *Antherae* inclusae, sessiles, lanceolatae, acutae. *Ovarium* glabrum, stylo filiformi 1·4-1·6 cm. longo, stigmate minute capitellato.

South Africa. Cape Province: Humansdorp Division; Witte Els Bosch, mountain slopes, 450 m., August 1920, *Fourcade* 810 (type). Knysna Division; Formosa Peak, 1350 m., 4 May 1933, *Compton* 4260.

A well-marked species, conspicuous on account of the length of its perianth tube, the silky white appearance of its young leaves, and the twelve squamae enveloped in hairs which exceed them in length.

1307. **Carex montis-Everestii** *Kükenthal* [Cyperaceae]; e sectione *Frigidarum* subsect. *Fuliginosarum*. Inter *C. nivalem* Boott et *C. macrogynam* Turcz. intermedia: a *C. nivali* differt s tatura humillima, foliis angustis, spiculis minoribus, terminali mascula, utriculis multo brevioribus; a *C. macrogyna* differt vaginis

basilaribus purpurascentibus integris (nec brunneis reticulatim fissis), squamis atro-fuscis nitidis glabris marginibus haud hyalinis, utriculis marginibus laevibus.

Rhizoma dense caespitosum et stoloniferum. *Culmus* 1·5–2 cm. altus, gracilis, impresso-trigonus, laevis, inferne foliatus. *Folia* culmo breviora, canaliculato-plana, carinata, vix 1 mm. lata, apice circinata ; vaginae basilares brunneo-purpureae, integrae. *Spiculae* 2, pedunculatae, subfastigiatae, subobovato-oblongae ; superior mascula, basi interdum floribus 1–2 femineis instructa, 5–6 mm. longa ; inferior longius pedunculata, feminea, 7–10 mm. longa, densiflora, subcernua ; pedunculi setacei, sublaeves. *Bracteae* squamiformes, basi vaginante rhachin amplectentes. *Squamae* ovato-lanceolatae, acutae, atro-fuscae, nitidae, e carina viridi breviter mucronatae, glabrae. *Utriculi* squamas subaequantes, papyracei, ovati vel elliptici, valde compressi, 2 mm. longi, subenerves, inferne pallide virentes, apice atro-sanguinei, glabri, marginibus laeves, in rostrum breve ore oblique sectum sensim abeuntes, basi breviter stipitati. *Nux* perlaxe inclusa, parvula, stipitata. *Stylus* fere inclusus. *Stigmata* 3, longa.

Tibet. Mt. Everest, Camp I, in moraine, 5460 m., 2 July 1933, *R. L. Wager*.

1308. **Paspalidium platyrrhachis** *C. E. Hubbard* [Gramineae-Paniceae] ; a *P. geminato* (Forssk.) Stapf axi primario lato dorso complanato, spiculis multo majoribus distinguitur.

Gramen aquaticum. *Culmi* longi, fluitantes, validiusculi, ramosi, glabri laevesque. *Folia* glabra, laevia ; vaginae latae, compressae, carinatae, tenuiter striatae ; ligulae brevissimae, truncatae, dense ciliolatae ; laminae lineares, basi abrupte contractae, in apicem subobtusum longe attenuatae, usque ad 18 cm. (vel ultra) longae et 6 mm. latae, planae. *Inflorescentia* subspiciformis, 22–28 cm. longa, erecta ; axis primarius laevis, glaber, usque ad 3 mm. latus, dorso complanatus, costa media flexuosa, internodiis alternatim lateraliter herbaceo-marginatis et alatis. *Racemi* circiter 10, 1–2·5 cm. longi, sessiles, erecti, solitarii vel nonnunquam bini, inferiores usque ad 4·5 cm. distantes ; rhachis dorso complanata, 1–2 mm. lata, in acumine subulato terminata. *Spiculae* subsessiles, biseriatae, contiguae, anguste ovatae, acutae, 3·3–4 mm. longae, pallidae, glabrae, laeves. *Gluma* inferior lata, apice rotundata, usque ad 1 mm. longa, hyalina, enervis ; gluma superior ovata, apice rotundata, 2 mm. longa, tenuiter membranacea, 2–5 nervis. *Anthoecium inferum* ♂ : lemma spiculam aequans, dorso planum, explanatum late elliptico-ovatum, firme membranaceum, 5–7-nerve ; palea ovato-elliptica vel elliptica, obtusa, lemmati subaequilonga, carinis angustissime alatis ; antherae 1·6 mm. longae. *Anthoecium superum* ♀ anguste ovato-ellipticum vel ellipticum, acutum, infero paullo brevius : lemma et palea coriacea, tenuiter transverse rugosa.

Northern Rhodesia. Kafue Flats, near Mazabuka, in very deep water in flood channels, 990 m., April 1932, *Trapnell* 1086.

1309. **Leersia oncothrix** *C. E. Hubbard* [Gramineae-Oryzeae] ; a *L. drepanotrichi* Stapf spiculis oblongis vel elliptico-oblongis multo majoribus differt.

Gramen perenne. *Culmi* e rhizomate brevi nudo erecti, 1·2 m. alti, graciles, subteretes, basi ramosi, superne simplices, 4-nodes, nodis minute pubescentibus, ceterum glabri laevesque. *Foliorum vaginae* glabrae, laeves, ore auriculatae, auriculis erectis angustis usque ad 4 mm. longis, inferiores internodiis longiores, compressae, papyraceae, superiores internodiis breviores, striatae ; ligulae membranaceae, auriculis adnatae ; laminae anguste lineares, acutissimae, usque ad 26 cm. longae, complicatae, marginibus convolutis, explanatae usque ad 3 mm. latae, glabrae, scaberulae. *Panicula* angusta, laxiuscula, 15 cm. longa, siccitate pallide brunnea ; axis primarius filiformis, minute scaberulus ; rami tenuiter filiformes, erecti, solitarii vel bini, asperuli, apicem versus 1–3 racemos gerentes, inferiores usque ad 8 cm. longi ; racemi 0·6–1·9 cm. longi, 3–7-spiculati ; pedicelli brevissimi. *Spiculae* oblongae vel elliptico-oblongae, 3·3–3·5 mm. longae, 1·5–1·7 mm. latae. *Glumae* minutissimae. *Lemma* semi-elliptico-oblongum, oblique acutum, tenuiter coriaceum, 5-nerve, pilis minutis rigidis semicirculariter curvatis laxe obsitum, carinis pilis similibus paullo longioribus ciliatum. *Palea* lemmati aequilonga et subsimilis, 3-nervis. *Antherae* 6, lineares, 2·5 mm. longae.

Northern Rhodesia. Kalomo, in wet vlei on rather sour soil, 1200 m., March 1932, *Trapnell* 993.

1310. **Tristachya longispiculata** *C. E. Hubbard* [Gramineae-Arundinelleae]; affinis T. *Rehmannii* Hack., sed paniculus et spiculis longioribus, foliorum laminis longioribus et latioribus differt.

Gramen perenne caespitosum, e rhizomate valido ortum. *Culmi* erecti, usque ad 1·2 m. alti, validiusculi, teretes, simplices, uninodes, glabri, paniculam versus scabridi, ceterum laeves ; internodia exserta, summum (pedunculus) usque ad 38 cm. longum. *Foliorum vaginae* rigidae, inferiores persistentes, basi sericeo-villosae, ceterae glabrae, superne asperulae ; ligulae ad seriem ciliorum redactae ; laminae lineares, in acumen tenue attenuatae, usque ad 45 cm. longae, 5–6 mm. latae, planae, firmae, glabrae, scaberulae. *Panicula* 22–25 cm. longa, contracta, nutans, 6–15 triades spicularum gerens ; rhachis gracilis, scaberula, glabra ; rami filiformes, scabridi, usque ad 8 cm. longi, inferiores 2–4-nati ; pedicelli 0. *Spiculae* anguste lanceolatae, acuminatae, 3–3·6 cm. longae. *Gluma inferior* anguste lanceolata, acuta vel subobtusa, 17–20 mm. longa, apice fragili excepto coriacea, 3-nervis, glabra ; gluma superior anguste lanceolata, longe subulato-acuminata, spiculae aequilonga, chartacea, 3-nervis, minutissime pubescens. *Anthoecium inferum* ♂ : lemma anguste lanceolatum, acute acuminatum, 25–27 mm. longum, tenuiter chartaceum, glabrum, asperulum, superne 5-nerve ; palea linear-

lanceolata, 18 mm. longa. *Anthoecium superum* ♀, lineare : callus gracilis, pungens, 2·5–3 mm. longus, barbatus ; lemma 7·5–9 mm. longum, bilobum, lobis in aristas capillares 16–20 mm. longas attenuatis, coriaceum, 7-nerve, minute pubescens ; arista 6·2-8 cm. longa, columna pallida scaberula 26–30 mm. longa ; palea linearis, 7 mm. longa. *Antherae* 3, 5–6 mm. longae. *Ovarium* apice pilosum.

Angola. Benguella ; country of the Ganguellas and Ambuellas, *Gossweiler* 2772.

XXXII—NOTES ON THE FLORA OF SOUTHERN AFRICA: V.* The Genus Ruellia in Thunberg's Herbarium.

R. A. Dyer and E. Milne-Redhead.

The authors are much indebted to the Director of the Botanical Institution, Uppsala, who kindly sent on loan to Kew the material of *Ruellia* in Thunberg's herbarium on which the following notes are based. All the specimens are types, two having been described by Linn.f. and four by Thunberg. Examination of these has made necessary a number of changes both taxonomic and nomenclatural. Two species (*R. depressa* and *R. spinescens*) had been transferred previously to their correct position in *Scrophulariaceae* under *Aptosimum* Burch.; now, however, a third, *R. ovata* Thunb., has to be referred to the same family under *Peliostomum* E. Mey. ex Benth. where it becomes synonymous with *P. virgatum* E. Mey. ex Benth. Of the remaining three species, two are retained in *Ruellia* and the third is placed in *Chaetacanthus* Nees. None of the specimens cited under *R. ovata* by Clarke (Thiselton-Dyer, Fl. Cap. **5**, pt. 1, 14) belongs to that species ; most of them are *R. cordata* Thunb., erroneously placed in the synonymy of *R. ovata* by Clarke, who had not the opportunity of examining Thunberg's types. Further, *R. pilosa* Linn.f., placed doubtfully under *R. ovata* by Clarke, is apparently identical with *R. Zeyheri* (Sond.) T. Anders. and the epithet "*pilosa*" takes priority.

Acanthaceae.

Chaetacanthus setiger (*Pers.*) *Lindl.* Nat. Syst. Bot. ed. 2, 444 (1836) ; Lindau in Engl. Jahrb. **18**, 38 (1893). *Ruellia aristata* Thunb. Prod. 104 (1800), non Vahl (1791). *R. setigera* Pers. Syn. **2**, 176 (1807). *Chaetacanthus Persoonii* C. B. Cl. in Thiselton-Dyer, Fl. Cap. **5**, pt. 1, 18 (1901), non Nees. *C. glandulosus* Nees in DC. Prod. **11**, 462 (1847) ; C.B. Cl. l.c. 19.

The pubescence and relative lengths of the calyx teeth and corolla-tube, used by Clarke to distinguish *C. Persoonii* and *C. glandulosus*, are variable characters and it seems impracticable to retain more than one species. Although placed in the genus *Ruellia* by both Thunberg and Persoon an examination of the flowers of the type specimen of *R. aristata* Thunb. (*Ruellia setigera* Pers.) shows it to have only 2 stamens and not 4 as was assumed by Clarke (l.c. 19), who in consequence excluded it from the genus *Chaetacanthus*.

* Continued from K.B. 1933, 462.

There are two β specimens named *R. aristata* in Thunberg's herbarium, one of which agrees with the type ; the other is *Barleria irritans* Nees.

Ruellia cordata *Thunb.* Prod. 104 (1800). *R. ovata* C.B. Cl. l.c. 14, pro parte, non Thunb. *Fabrina rigida* E. Mey. in Drege, Zwei Pflanzengeogr. Documente, 134, 185 (1843), nomen.

Ruellia pilosa *Linn.f.* Suppl. 290 (1781) ; Thunb. Prod. 104 (1800). *Dipteracanthus Zeyheri* Sond. in Linnaea, **23,** 90 (1850). *Ruellia Zeyheri* (Sond.) T. Anders. in Journ. Linn. Soc. **7,** 25 (1863), C.B. Cl. l.c. 13. *R. ovata* C.B. Cl. l.c. 14, pro parte, non Thunb.

Scrophulariaceae.

Aptosimum depressum (*Linn.f.*) *Burch.* Trav. S. Afr. **1,** 260 (1822), nomen, ex Benth. in Bot. Reg. t. 1882 (1836) ; Hiern. in Thiselton-Dyer, Fl. Cap. **4,** pt. 2, 131 (1904). *Ruellia depressa* Linn.f. Suppl. 290 (1781) ; Thunb. Prod. 104 (1800).

Aptosimum spinescens (*Thunb.*) *E. Weber* in Beih. Bot. Centralbl. **21,** 2, 18 (1907). *Ruellia spinescens* Thunb. Prod. 104 (1800). *Aptosimum abietinum* Burch. Trav. S. Afr. **1,** 308 (1822) ; Hiern l.c. 128.

Peliostomum virgatum *E.Mey. ex Benth.* in Bot. Reg. sub. t. 1882 (1836) ; Hiern, l.c. 133 (1904) ; E. Weber l.c. 91 (1907). *Ruellia ovata* Thunb. Prod. 104 (1800), non Cav. (1794) et non C.B. Cl. l.c. 14.

Miscellaneous New Species.

R. A. Dyer.

Wahlenbergia kowiensis *R. A. Dyer*, sp. nov. [Campanulaceae], affinis *W. macrae* Schltr. et v. Brehmer, habitu strictiore, foliis latioribus ascendentibus, floribus confertis cum fructibus majoribus distinguitur.

Herba annua, erecta, e basi parce ramosa, circiter 15 cm. alta ; rami dense foliati, inferne pilis albidis reflexis induti. *Folia* late linearia, acuta, usque ad 1·5 cm. longa, circiter 2 mm. lata, serrulata, glabra, demum submembranacea. *Inflorescentia* crebre cymosa, breviter pedunculata, pauciflora ; pedicelli laterales usque ad 1 cm. longi, glabri ; bracteolae anguste lanceolatae. *Receptaculum* campanulatum, costatum. *Calycis* segmenta linearia, acuta, 3-3·5 mm. longa. *Corollae* tubus 3 mm. longus ; lobi lanceolati, 3·5 mm. longi. *Stylus* pubescens, 2·5–3 mm. longus, stigmate trifido cylindrico crasso 2 mm. longo coronatus.

Eastern Cape Province. Bathurst Division : Kowie West ; in grass on sandy knolls behind coastal bush, occasional, flowers white, 27 Nov., 1921, *Miss L. Britten* 2844.

Cineraria Britteniae *Hutch.* et *R. A. Dyer*, sp. nov. [Compositae], affinis *C. deltoideae* Sond., sed foliorum auriculis majoribus, lamina reniformi-orbiculari (haud deltoidea), achaeniis vix alatis differt.

Herba ; caulis leviter flexuosus, angularis, angulis purpureis, parce pubescens, demum glabrescens. *Folia* reniformi-orbicularia, basi late cordata, 3·5–4·5 cm. lata, digitate lobulata et nervosa, lobulis repando-dentatis vel crasse serratis, parce pubescentia vel glabra ; petioli 2–4 cm. longi, basi auriculis plerumque magnis amplexicaulibus suborbicularibus repando-dentatis alati. *Inflorescentia* laxe corymbosa ; pedunculi ultimi bracteis 3–5-linearibus vel subulato-lanceolatis instructi. *Involucrum* campanulatum, circiter 5 mm. diametro ; bracteae circiter 12, lineari-lanceolatae, striatae, 4–5 mm. longae. *Flores* radii circiter 5, flavi. *Achaenia* lenticularia, obscure costata et minutissime papillosa, vix alata.

Eastern Cape Province. Albany Division : Signal Hill, near Grahamstown, edge of bush on southern slope, 25 Dec., 1926, *Miss L. Britten* 5550 (type) ; in shady woods near Grahamstown 2,000 ft., MacOwan 522 (partim). Stockenstrom Division : Katberg, 3,000–4,000 ft., Feb., *Baur* 1067.

Helichrysum vellereum *R. A. Dyer*, sp. nov. [Compositae] ; affinis *H. crassifolio* Less. inflorescentiis minus ramosis, capitulis compactiore aggregatis foliis superioribus approximatis, bracteis interioribus minoribus apice rotundato margine plano haud rugoso acheniis glabris distinguitur.

Herba perennis robusta, inferne plerumque sublignosa, usque ad 40 cm. alta, basi ramosa. *Caules* subdecumbentes vel plus minusve erecti, albo-tomentosi, plus minusve ramosi, ramis brevibus alternis. *Folia* oblongo-vel spatulato-oblanceolata, inferne angustata, sessilia, obtusa, 2–5 cm. longa, 0·5–1 cm. lata, utrimque aequaliter albo-tomentosa. *Capitula* apice ramorum brevium glomerata vel arcte subcorymbosa, foliis superioribus approximata. *Involucrum* campanulato-cylindricum, circiter 4 mm. altum, 4 mm. latum floribus plus minusve aequalibus ; bracteae arcte imbricatae, inferne tomentosae, superne planae, scariosae, albae, erectae vel leviter patentes, apice rotundatae. *Receptaculum* planum. *Pappi* setae superne attenuatae, subcapillares, barbellatae. *Achaenia* 1 mm. longa, glabra.

Eastern Cape Province. Bathurst Division : sand dunes near the mouth of the Great Fish River, Jan., Feb., *MacOwan* 1441 (type); sand hills on sea shore near Port Alfred, Dec., *Galpin* 2931 ; Port Alfred, Jan., *Salisbury*, without number ; Humansdorp Division : common at Slang River on sand near beach ; subdecumbent, heads white, Nov., *Phillips* 3378. A note in Kew Herbarium states that *Fourcade* 1821 is equal to *Phillips* 3378 and was collected at the same time and place.

Senecio mimetes *Hutch.* et *R. A. Dyer*, sp. nov. [Compositae], affinis *S. lanceo* Ait. sed virgata, ab initio glabra, foliis irregulariter

dentatis minus auriculatis, pedunculorum bracteis paucioribus et minus conspicuis differt.

Herba virgata circiter 1 m. alta ; caulis foliatus, glaber, costatus. *Folia* oblongo-lanceolata ad anguste triangulari-lanceolata, basi amplexicaulia et breviter decurrentia, apice acuta, 4–6 cm. longa, 1–2 cm. lata, irregulariter dentata, ab initio glabra, coriacea, nitida, superiora sensim minora et laxiora. *Inflorescentia* laxe corymbosa, gracilis, ramis inferioribus elongatis ; bracteae foliaceae, acute acuminatae ; pedunculi ultimi bracteis paucis linearibus instructi. *Involucrum* late campanulatum, 7–8 mm. diametro ; bracteae circiter 20, lineari-lanceolatae, acuminatae, carinatae, 4–5 mm. longae, glabrae. *Flores* radii pauci, flavi. *Achaenia* nigrescentia, sulcata, glabra. *Pappus* albus.

Eastern Cape Province. Uitenhage Division : Van Staadens Berg, foot of mountain, below 1,000 ft., Dec. *Drege* (type) ; without locality, *Zeyher* 701. Albany Division: amongst rocks at Howieson's Poort, Dec., *MacOwan* 696. Bathurst Division : between Kaffir Drift and Blaauwkrantz, Sept., *Burchell* 3878.

Scabiosa albanensis *R. A. Dyer*, sp. nov. [Dipsacaceae] ; *S. anthemifoliae* E. et Z. affinis, caulibus elongatis foliatis breviore pubescentibus, foliis inferioribus bipinnati-partitis lobis linearibus glabris vel sparse hispidis, capitulis minoribus differt.

Caules erecti vel suberecti, basi lignosi; rami subrigidi vel graciles dense foliati, hispidi, pilis brevibus reflexis satis induti. *Folia* caulium basin versus demum decidua, superne numerosa ; inferiora bipinnati-partita, 3–5 cm. longa, lobis linearibus ; superiora pinnati- vel bipinnati-partita, glabra vel sparse hispida, margine revoluto. *Pedunculi* 12–20 mm. longi, graciles, pilis paucis sed infra capitulum densioribus hispidi. *Capitula* subglobosa ; involucri bracteae lineares vel anguste lineari-lanceolatae. *Calycis* setae ante anthesin ultra alabastra capituli distincte exsertae ; involucelli arcte costati. *Corolla* 4-fida, vix 1 cm. longa, extra dense pubescens. *S. columbaria* Linn. var. *dissecta* Sond. in Harv. et Sond. Fl. Cap. 3 : 43 pro parte ; *S. pallida* var. E. Mey. *a*, in Drege Zwei Pfl. Docum. 218.

Eastern Cape Province. Albany Division : Beggars Bush near Grahamstown in grassveld on mountain slope, May, *Britten* 1965 (type) ; Assegai Bush, *Drege* ; Featherstone Kloof, in grass, *MacOwan* 204.

Euphorbia Nesemannii *R. A. Dyer*, sp. nov. [Euphorbiaceae] ; affinis *E. mammillari* Linn. radice tuberosa caudice brevissimo subterraneo continua, ramis apice caudicis emittentibus haud vel perrariter ramosis haud tuberculatis distinguitur.

Planta succulenta, perennis, dioica, armata, radice tuberosa. *Tuber* caudice continuum, subcylindricum, basin versus angustatum vel ramosum, radicibus paucis tenuibus instructum ; radices nonnunquam ramos aerios emittentes. *Caudex* brevissimus, apice ramis 5-pluribus instructus. *Rami* 6–14-angulati, 8–30 cm. longi,

rariter masculorum 40 cm. longi, 1–3 cm. crassi, basi angustati; anguli crebri, 2-3 mm. prominentes, pedunculis persistentibus armatis. *Folia* minutissima, mox decidua. *Cyathia* apice ramorum aggregata; mascula plura, pedunculata; pedunculi 0·5–1·5 cm. longi, bracteis circiter 5 superioribus plus minusve oblongis ciliatis obtusis mucronulatis instructi; involucrum campanulatum, glabrum; glandulae contiguae, transverse oblongo-ellipticae, 1–1·25 mm. latae; lobi interiores crasse fimbriati; feminea subsimilia sed breviori-pedunculata. *Ovarium* glabrum, sessile; styli circiter 1·5 mm. longi, basin versus connati, apice breviter bilobi. *Capsula* triloba, 4–5 mm. diametro, glabra.

Cape Province: Robertson Division; in rich soil under large "Haakdoorn" on dry ridge about 1½ miles south of Robertson, rare, *Nesemann ex Dyer* 2437 ♀; dry ridge 1½ miles from Robertson under small bushes, *Nesemann ex Dyer* 2438 ♂; dry gravel kopje west of Robertson, *Nesemann ex Dyer* 2440 ♀ (type); amongst *Rhenoster* bushes in fairly rich soil, 3 miles north of Robertson, *Nesemann ex Dyer* 2441 ♂ (type).

I am greatly indebted to Mr. A Nesemann, who took great trouble in collecting a representative series of specimens from different habitats near Robertson and forwarded them to the Albany Museum, Grahamstown, in July 1930. Plants in rich soil and those deriving additional moisture from a watercourse spill-way were comparatively luxuriant, some branches attaining a height of 2 ft., whereas mature plants on dry stony ridges were occasionally only 6 in. high. During normal development the main root is tuberous and carrot-like, but in the event of the tuber decaying the branches are supported by the lateral fibrous root-system. From some of these fibrous roots near the surface, one or a series of aerial branches may be produced, more commonly so on plants in dry and stony areas. In addition to the effect of external factors the number of angles is apparently influenced both by the age of the branches and age of the plant: branches from old plants having more angles than branches of similar size from young plants. Variations in the inflorescence were also found: three sessile involucres occasionally terminated a peduncle, and some cyathia had 6 glands and 6 inner lobes.

The closest affinity of *E. Nesemannii* is with *E. mammillaris* Linn. and *E. fimbriata* Scop. It seems doubtful whether the latter two are distinct species, but owing to the absence of type specimens it must remain a matter of opinion.

Euphorbia tubiglans *Marl.* MS., sp. nov. [Euphorbiaceae]; affinis *E. Susannae* Marl. a qua tubero caudice continuo subterraneo napiformi vel fusiformi, ramis longioribus minus tuberculatis apice caudicis emittentibus, glandulis involucri marginibus lateralibus involutis pseudotubulosis differt.

Planta succulenta, humilis, perennis, dioica, anacantha, radice tuberosa. *Tuber* caudice brevissimo continuum napiforme vel fusiforme, 2–5 cm. crassum, junior tenerum, demum durum cortice

rimulato. *Rami* 2–5, succulenti, apice caudicis subterrannei emittentes, plerumque pentagoni rariter hexagoni, usque 12 cm. longi, 1·3–1·7 cm. crassi, basin versus subcylindrici, ad pedem angustati et stipiformes ; anguli crebri, juniores 3–4 mm. prominentes virides, basibus foliorum leviter tuberculati. *Folia* triangulari-acuta, canaliculata, ciliata, mox decidua. *Cyathia* apice ramorum aggregata ; mascula 3–6, pedunculata ; pedunculi circiter 2·5 mm. longi, apicem versus bracteis oblongis obtusis instructi ; involucrum campanulatum, glabrum ; glandulae margine crasse denticulatae, marginibus lateralibus involutis, pseudotubulosae, rubrae ; lobi interiores albo-fimbriati ; feminea subsimilia sed breviori-pedunculata. *Ovarium* pilosulum ; styli 3 mm. longi, 1 mm. connati. *Capsula* triloba, subglabra.

Cape Province. Steytlerville Division : near Steytlerville, *Herre* 1596 (type) ; near Steytlerville in karroid veld, *Pringle*, without no. Ladismith Division : near Lemonshoek and Garcia Pass on small cone-shaped peak in the open and near rocks, *R. Primos in Herb. Marloth* 13724. Swellendam Division : Angora near Bonnievale in Breede River valley, *Smith in Herb. Marloth* without no.

The herbarium specimens and notes which form the basis of this description were forwarded by the widow of Dr. R. Marloth to Dr. I. B. Pole-Evans, Chief of the division of Plant Industry, South Africa. The type specimen flowered at Stellenbosch University, and others in Dr. Marloth's garden in Cape Town during Jan. 1931. Flowering material to complete the specimen collected by Dr. Pringle in 1933 was received independently at Kew from the Albany Museum, Grahamstown, by the same mail which contained Dr. Marloth's notes from Pretoria. The trivial name was suggested by the distinctive shape of the involucre-glands.

Agathosma bicornuta *R. A. Dyer*, sp. nov. [Rutaceae] ; affinis *A. thymifoliae* Sond. a qua ramulis pubescentibus foliis minus orbicularibus vel ellipticis persistentioribus calycis segmentis oblongis brevioribus ovario 2-lobo valde distinguitur.

Fruticulus subrigidus, 30–60 cm. altus, dense ramosus ; ramuli graciles, breviter pubescentes, imbricato-foliati. *Folia* perbreviter petiolata, ovalia vel elliptica, rariter orbicularia vel elliptico-ovata, suberecta, 3–4 mm. longa, 1·5–2 mm. lata, obtusa, superne leviter recurvata, glabra, infra glanduloso-punctata apicem versus glandulo maiore instructa, supra eglandulosa, subconcava. *Umbella* 12–15-flora ; pedicelli graciles, 2·5–3·5 mm. longi, glabri, basi minutissime bracteolati. *Calyx* glaber, 5-partitus, segmenta oblonga, obtusa, 0·5 mm. longa, leviter incrassata. *Petala* oblanceolata vel lineari-oblanceolata, apice rotundata, 2·5–3 mm. longa, extra glabra intra pilis paucis induta. *Stamina* 5, circiter 5 mm. longa ; staminodia filiformia, 2–3 mm. longa, medio pilis patulis induta, apice glandulo minuto instructa. *Discus* cupularis satis productus, margine leviter 5-crenato. *Ovarium* 2-loculare ; cocci cornuti ; cornu ovario

aequilongo. *Stylus* filiformis, usque 5mm. longus, glaber.—*A. thymifolia* Dummer in Fedde Rep. 11, 407 (1912) non Schlechtendal.

Eastern Cape Province. Albany Division : on the rocky slopes of Bothasberg, 2200 ft., July, Aug. and Sept., *MacOwan* 560 (type) ; " Hounslow " farm, on dry scrubby hills, 1600 ft., Sept., *Galpin* 75. Somerset East Division : Commadagga (near the border of Albany Division) on dry hillside, July, *Burchell* 3324.

MacOwan sent duplicate material of his no. 560 to Sonder who referred it to *A. thymifolia* Schechtendal. This species was otherwise known only from the sand hills near Saldanha Bay, but apart from the widely separated localities and different habitats, *A. bicornuta* is readily distinguished by the characters given above. Further, the capsules are 2-coccus and those of *A. thymifolia* 4-coccus, whereas *Agathosma* species are usually 3-coccus. Dummer l.c. gave no description and merely cited under *A. thymifolia*, the two specimens *Burchell* 3324 and *MacOwan* 560.

Agathosma clavisepala *R. A. Dyer*, sp. nov. [Rutaceae] ; affinis *A. piliferae* Schlechtendal et *A. Nivenii* Sond. ab illa foliis oblongis obtusis haud ciliato-mucronatis ovario bicornuto, ab hac foliis leviter latioribus margine minus recurvato pedicellis longioribus pilosis ab ambabus calycis lobis angustioribus apice clavato differt.

Frutex satis vel intricato-ramosus, subrigidus, 0·5–1 m. altus ; ramuli graciles, dense foliati, puberuli, pilis recurvis induti. *Folia* breviter petiolata, patula vel subreflexa, oblonga vel subovalia, obtusa vel rariter subacuta, basi rotundata, 3–5 mm. longa, 1·25–2 mm. lata, glabra, supra plana, infra subconcava, eglandulosa, leviter costata, margine leviter recurvato glandulo-crenato; petioli glabri, erecti, ramulis subadpressi, 0·5–1 mm. longi. *Umbella* plus minusve 12-flora ; pedicelli graciles, pilosi, 3–5 mm. longi, basi minutissime bracteolati. *Calyx* persistens, 5-partitus ; segmenta 1·5 mm. longa, inferne ovato-lanceolata, ciliata, apice crasso clavato glabro. *Petala* oblonga vel leviter ovato-oblonga, obtusa, 4 mm. longa, 1·5 mm. lata, alba, basi breviter unguiculata, intra basem versus pilis brevibus recurvis induta. *Stamina* 4–5 mm. longa ; staminodia anguste elliptica, circiter 2 mm. longa, patente pilosa, glandula apiculo notata. *Discus* cupularis, margine 5-crenato. *Ovarium* 2-lobum, disco immersum. *Stylus* filiformis 4–5 mm. longus, glaber. *Fructus* 4–5 mm. longus, bicornutus, rugosus.

Eastern Cape Province. Albany Division : near Salem, June, *Wilmot in Nat. Herb. Pretoria* 15304 (type) ; " Rockcliffe " near Sidbury, Nov., *Daly* 822. Bathurst Division : Southwell, on banks of small stream, Nov., *Britten* 2244.

This species is readily distinguished from its near allies by the clavate calyx-segments. Mr. L. S. Wilmot states that butter is tainted when made from the milk of cows which have grazed it.

XXXIII—ADDITIONS TO THE FLORA OF CYPRUS.

A. K. Jackson.

The Director has received through the Director of the Department of Agriculture, Cyprus, a second valuable collection of dried specimens made by Mr. A. Syngrassides in various parts of the island. The specimens have been identified and laid into the Herbarium. Several species new to the flora were noted in the course of determining the collection and these are given below. Three species found by Druce but not given by Holmboe from Cyprus are also included here as confirmation of Druce's records. Some numbers of Sintenis and Rigo represented at Kew but apparently not seen by Holmboe are also quoted.

It is probable that a considerable number of species which occur in the island have yet to be collected. Herbarium material and fruits and seeds for cultivation would be welcome.

Eruca sativa *Mill.* Gard. Dict. ed. 8, n. 1. (1768). var. **eriocarpa** (*Boiss.*) *Post* Fl. Syria, 79 (1896).

Brassica Eruca L. var β S. et S. Fl. Graec. 43 t. 647 (1830).

Mia Milia-Mandres, 29.3.33, above sea level, growing on rocky grounds, *Syngrassides* 323.

Holmboe in his " Studies on the Vegetation of Cyprus " (1914) does not record this variety from Cyprus, although there is a figure of the plant under the name *Brassica Eruca* L. in Sibthorp and Smith Fl. Graec. 43. t. 647. (1830) with the locality given as " In insula Cypri campis depressis."

The variety *eriocarpa* has been found in Spain, Asia Minor, Syria, Palestine and North Africa.

Trigonella spinosa *L.* Sp. Pl. 777 (1753).

Nursery Garden, Kyrenia, 21.4.33, growing in a good loam among cultivated plants, *Syngrassides* 182.

This species was hitherto only known to occur in Syria, Palestine, Rhodes, and possibly Crete. Linnaeus gives the locality as Crete only, but as the plant has never since been found in the island, recent authors (Hal. Fl. Graec. 1,353 : 1900 ; Hayek, Prod. Fl. Balc. 1,832 : 1926) have doubted its occurrence there. Now that the species has been collected in Cyprus, it seems to be more probable that the plant was and possibly still is to be found in Crete, since the floras of the two islands are closely related in many ways.

Medicago scutellata *Mill.* Gard. Dict. ed. 8 n. 2 (1768).

Myrtou, 6.5.32, in barley-crops, *Syngrassides* 203.

There is a specimen of this species in Herb. Kew collected " in agris pr. Larnaka vacchia," 4.3.1880, *Sintenis et Rigo* 821, but Holmboe does not record the species in his " Studies on the Vegetation of Cyprus."

The species occurs in France, Portugal, Spain, Italy, Balkan Peninsula, Russia, Syria and Palestine.

Centaurium spicatum (*L.*) *Fritsch* in Mitteil Naturwiss. Ver. Wien, **97** (1907). *Erythraea spicata* (*L.*) *Pers.* Syn. **1**, 283 (1805). *Gentiana spicata* L. Sp. Pl. 230 (1753).

Kykko, near Nicosia, 20.6.32, growing on old walls of water tanks, *Syngrassides* 398.

Widely distributed throughout the Mediterranean region. Portugal, Iraq, Persia and Afghanistan.

Scrophularia peregrina *L.* Sp. Pl. 621 (1753)

Lefka, 4.4.32. In orange groves etc., *Syngrassides* 246.

Holmboe records only one species of *Scrophularia* for the island, *S. sphaerocarpa* Boiss. et Reut. There are, however, in Herb. Kew specimens of *S. peregrina* collected by Sintenis from two localities in Cyprus :—Carpass. in rupibus prope Kantara, 17.4.1880, *Sintenis et Rigo* 142; Prope Galata, 25.6.1880, *Sintenis et Rigo* 172.

Druce also records the species from Lapithos, Cyprus, in Rep. B. E. C. **9**, 469, 1930 (1931).

Occurs mainly in the Mediterranean region.

Micromeria Juliana (*L.*) *Benth.* Lab. 373 (1834).

Agios Epiktitos, 24.5.32, growing on roadsides, *Syngrassides* 280. In vineis prope Galata, 16.6.1880, *Sintenis et Rigo* 563.

Occurs in Portugal and most of the countries of the Mediterranean.

Lamium maculatum *L.* Sp. Pl. ed. 2, 809 (1763).

Pedoulas, 28.3.32, High. Alt., growing in hedges, stones, banks etc., *Syngrassides* 51.

Distributed throughout Europe from the British Isles and Scandinavia to Portugal and the Mediterranean region and eastwards to Persia.

Plantago Bellardii *All.* Fl. Pedem. **1**, 82, t. 85, f.3 (1785).

Before Athalassa, 8.4.33. Above sea level, on dry rocky fields, *Syngrassides* 13.

A species common in South Europe and the Orient.

Chenopodium murale *L.* Sp. Pl. 219 (1753).

Cuodhara beyond Kythraea, 8.4.32, growing as a garden weed, *Syngrassides* 375.

Also collected by Sintenis at Kythraea, May 1880, *Sintenis et Rigo* 587. Druce in his list of new records for Cyprus in the B.E.C. Report 1930 (1931) states that the plant is common at Limassol and that it is probably the *C. rubrum* of Holmboe. As *C. murale* is a common weed of cultivation in the Mediterranean area and as *C. rubrum L.* is not found in that region at all, it seems certain that the two species have been confused. Holmboe did not find the so-

called *C. rubrum* himself, his record is based on a plant collected by Samson without special locality and listed in Thompson's Flora of Cyprus, Journ. Bot. **44**, 337 (1906).

Kythraea, 13.5.32, by running waters on banks of streams *Syngrassides* 219. Kythraea, 13.5.32, by running waters, quite common, *Syngrassides* 291. Ad rivulos Kythraea, 7.6.1880, *Sintenis et Rigo* 677.

Common throughout Europe, Orient and N. Africa.

Euphorbia biglandulosa *Desf.* in Ann. Mus. Par. **12**, 114 (1808).

Saïtta, 9.3.32, growing on mountains, *Syngrassides* 348.

Occurs in Sicily, Greece, Asia Minor and Syria.

Urtica urens *L.* Sp. Pl. 984 (1753).

Cuodhara beyond Kythraea, 8.4.32, growing as a garden weed, *Syngrassides* 374.

This species is recorded by Druce in Rep. B.E.C. **9**, 469, 1930 (1931), from Tsuda, Limassol, Famagusta, Ay Napa, and Nicosia.

Very common throughout Europe, Eastern Asia and North Africa.

Brachiaria eruciformis (*S. et S.*) *Griseb.* in Ledeb. Fl. Ross. **4**, 469 (1853).

Panicum eruciforme S. et S. Fl. Graec. **1**, 44, t. 59 (1806).

Lapithos, Experimental Lime Plantation, 12.6.32, in cultivated fields, in wet places, *Syngrassides* 217.

Originally described from the island of Samos, since found in South Italy, Sicily, Macedonia, Asia Minor, Syria, Persia, Egypt and Abyssinia.

Setaria viridis *P. Beauv.* Agrost. 51 (1812).

Lapithos, Experimental Lime Plantation, 12.6.32, quite a common weed in gardens, *Syngrassides* 237.

Generally distributed throughout Europe, Caucasus, Asia Minor, Persia, Arabia, N. Africa, Afghanistan, Siberia, and Japan.

Cutandia memphitica (*Spr.*) *Richt.* Pl. Eur. 77 (1890).

Dactylis memphitica Spr. hort. Hal. add. **1**, 20 (1799).

Famagusta, in the Nursery Garden, 10.3.33, in sandy soil, *Syngrassides* 42.

Occurs in south-east Spain, Syria, Palestine, Arabia, Egypt Persia, and North Africa.

Serrafalcus arvensis (*L.*) *Parl.* Fl. It. **1**, 393 (1848).

Bromus arvensis L. Sp. Pl. 77. (1753).

Between Nisou and Stavrovouni, 12.4.33, in dry hills, on rocky ground, *Syngrassides* 18.

Common throughout Europe, Asia Minor, Iraq and Persia.

XXXIV—THE GIANT LOBELIAS OF EAST AFRICA.*

E. A. Bruce.

Addenda et Corrigenda

Arising out of correspondence with Professor L. Hauman and his paper on the same subject (Les Lobelia Géants des mont. du Congo Belge, Dec. 1933), the following additions and corrections should be made in the paper which was published in *Kew Bull.* 1934, p. 61 *et seq.*

p. 62, **L. lanuriensis** *De Wild.* was first described in 1920 (see below).

pp. 65, 70, 76, 77, for *L. karisimbensis* R. E. Fr. and Th. Fr. jr., read **L. lanuriensis** *De Wild.* and vice versa.

L. lanuriensis *De Wild.*, although not included in Fries' revision " Die Riesen-Lobelien Afrikas " (1922), was first published in 1920 (Rev. Zool. Afr. 8, Suppl. Bot. 29) and therefore has precedence over *L. karisimbensis.*

pp. 62, 65, 68, 76, the name *Lobelia Stuhlmannii* Schweinf. should be regarded as a *nomen confusum* and discarded (see Hauman l.c., pp. 13, 22, 24, 25 (1933).

Stuhlmann's no. 2406 becomes **L. lanuriensis** var. **Ericeti** *Hauman.*

p. 73, add as synonym under **L. Mildbraedii** *Engl. L. sauvibracteata* Hauman, and add to geography :—Belgian Congo : Kivu, Lake Kani, about 7300 ft., *Scaetta* 35M, 22M.

p. 68, to the Longisepala Series add **L. petiolata** *Hauman* (Hauman l.c. p. 36) ; this differs from *L. longisepala* in its narrower leathery leaves and shorter pedicels, and from *L. lukwangulensis* in its laxer inflorescence and larger flowers.

L. intermedia *Hauman* (l.c. p. 31). This may prove to be only a high altitude form of *L. giberroa* Hemsl., which has a wide range and is very variable. B. D. Burtt's specimen, no. 3140, from the same locality, is identical with the type of *L. intermedia,* the flowers of which are the same as those of *L. giberroa,* though the leaves are narrower.

XXXV—MISCELLANEOUS NOTES

Leonard Cockayne.—We have to announce, with deep regret, the death, early in July, of Dr. Leonard Cockayne, C.M.G., F.R.S., F.N.Z.Inst., Honorary Botanist to the New Zealand State Forest Service. An account of Dr. Cockayne's work will appear in a subsequent number of the Bulletin.

James Groves.—James Groves was born in London on January 19th, 1858, the youngest of a family of three who collaborated in a lifelong study of one of the most isolated and difficult groups of plants, the *Charophyta.* For a number of years before his death

* Continued from K.B. 1934, 88.

on March 20th, 1933, he was recognized throughout the world as the authority on these plants, and all the more critical material received at Kew was identified by him.

In 1880, with his elder brother Henry Groves, he published a "Review of the British Characeae" in the "Journal of Botany," and in 1920 and 1924 appeared the two volumes of his *magnum opus*, a monograph on "British Charophyta," published by the Royal Society. Three years ago Groves, in conjunction with the present writer, started a conspectus of the world's Charophyta. It is much to be regretted that his unique critical knowledge will not be available when completing this work.

British botanists will recall that it was Henry and James Groves who edited the ninth edition of Babington's "Manual of British Botany" in 1904.

Groves was also interested in botanical nomenclature, and took an active part in the discussions at the Imperial Botanical Conference in London in 1924. From time to time he contributed to the "Journal of Botany" notes dealing with various points in nomenclature.

C. V. B. MARQUAND.

Nathaniel Lord Britton.—Dr. N. L. Britton, who died on June 25 last in his seventy-sixth year, achieved distinction not only by his personal scientific research, but also as an organizer and administrator. His name will always be associated with the foundation and rise of the New York Botanical Garden, which had become one of the great botanical Institutions of the world by the time of his retirement in 1929. Born on January 15, 1859, Britton took the degree of E.M. at Columbia University in 1879, proceeding to Ph.D. two years later. From 1879 to 1887 he was Assistant in Geology at the University, and from 1880 to 1890 Botanist and Assistant Geologist in the New Jersey Geological Survey. Most of his early scientific papers, however, dealt with botanical subjects, and in 1887 he became Instructor in Botany at Columbia University, in 1890 Adjunct Professor, and in 1891 Professor of Botany, a position which he relinquished in 1896 after his appointment as first Director-in-Chief of the New York Botanical Garden.

The Act of Incorporation of the New York Botanical Garden, approved in 1891 and amended in 1894, provided that as soon as the Corporation had raised the sum of $250,000, a part of Bronx Park should be appropriated for the Garden, and the City of New York would erect a suitable fire-proof building for a botanical museum and herbarium, with lecture-rooms and laboratories. The required amount was raised by June, 1895, by means of subscriptions of $25,000 each from Columbia College, J. Pierpont Morgan, Andrew Carnegie, Cornelius Vanderbilt, John D. Rockefeller, D. O. Mills, and the Hon. Addison Brown, and smaller sums from other indi-

viduals and firms. By an agreement dated January 8, 1896, Columbia University undertook to deposit its Herbarium and Botanical Library with the New York Botanical Garden, mutual facilities for study being arranged between the two Institutions.

As an original member and Secretary of the Corporation, one of the original board of Scientific Directors, and first Director-in-Chief (1896-1929), Britton took a predominant part in the development of the Garden. A portion of the northern part of Bronx Park of about two hundred acres was allotted for the Garden and accepted in August 1895, and a topographical survey of the tract, with a map on the scale of fifty feet to the inch with five foot contours, was completed by the end of the year. A commencement of the educational work of the Garden was made in 1895 by labelling 100 of the largest trees.

Plans for the development of the Garden and Museums were approved before the end of 1896, those for the Museums including sections devoted to Economic Plants, General Botany, Physiology, Palaeobotany, and the illustration of the flora within 100 miles radius of New York, by means of herbarium specimens mounted in swinging frames. Pending the construction of the buildings the accumulated museum and herbarium material had to be stored in six different places.

The scientific staff in 1898 included George V. Nash, General Assistant, Willard N. Clute, Curator, and W. R. Maxon, Assistant in herbarium and museum work, in addition to Drs. P. A. Rydberg, J. K. Small, Marshall A. Howe and others who were employed for short periods.

The year 1900 was memorable for the completion of the Museum building and of eight houses of the main Conservatories. In that year over 50,000 museum and herbarium specimens were added to the collections and about 112,000 specimens were mounted for the herbarium. The staff had meantime increased to ten members. The sole publication hitherto issued had been the "Bulletin of the New York Botanical Garden," of which the first part appeared in April, 1896. This was reinforced in 1900 by the "Journal" edited by Dr. D. T. MacDougal, who had been appointed Director of the Laboratories in 1899. The first volume contains accounts of the Museum Building, Library, Herbarium, Plantations, Laboratories and Horticultural Houses and a report on Britton's official visit to Europe in 1900 in connexion with the Paris Exposition and the International Botanical Congress held in conjunction with it.

Among his many activities was the promotion of botanical exploration, especially in America. As early as 1897, botanical collections were made in Montana by Rydberg and Bessey, with the aid of funds supplied by Mr. W. E. Dodge, the results appearing as a "Catalogue of the Flora of Montana and the Yellowstone Park," in the first volume of the "Memoirs of the New York Botanical Garden" (1900). In 1898 Mr. and Mrs. Heller were sent to Porto

Rico to collect economic and herbarium material, at the expense of Mr. Cornelius Vanderbilt. By the year 1905 the staff of the Garden had increased to sixteen, and the " Journal " of that year records the results of botanical explorations in the Bahamas by Nash and Britton, in Haiti by Nash, in Arizona, Mexico and California by MacDougal, in Panama by Cowell, and in Utah by Rydberg. The same volume contains a report by Britton on his trip to Europe during May-July 1905, for the purpose of visiting certain European botanical gardens and museums and of attending the International Botanical Congress held at Vienna, in which he took a prominent part. It is gratifying to note that he found the equipment and facilities provided for work at Kew " as complete and convenient as could be devised," and that he " thoroughly enjoyed consulting the herbarium and library " during his visit.

The nomenclatural decisions of the Vienna Congress, and especially the establishment of a list of conserved generic names, were unacceptable to Britton and to various other botanists in the United States, and they accordingly rejected the International Rules of Nomenclature and proposed a new set of rules entitled, " American Code of Botanical Nomenclature " (Bull. Torr. Bot. Club, **34**, 167-178 : 1907). For some time feeling ran high, the view being expressed, by supporters of the International Rules, that those who took part in an International Congress were morally bound to abide by its decisions. Britton, however, was of opinion that strict priority of publication should be observed, and that it was unjust to reject an earlier plant name in favour of a later one, even if the latter were much better known. Britton was sensitive, although he did not show it, and he may be honoured, even by those who regard his views as mistaken, for enduring what must have been a very unpleasant situation rather than be false to his convictions. The so-called " American Code "—the title was a source of offence to many American botanists—was, however, in certain respects in advance of the International Rules, notably in the explicit recognition that plant names should be applied according to a type-method, and a few of its best features were eventually accepted by the International Botanical Congress held at Cambridge in 1930.

Rigid adherence to priority, though causing great practical inconvenience by the extensive name changes entailed, nevertheless had its merits in calling attention to the need for bibliographical research. Many systematic botanists in the nineteenth century had omitted to pay adequate attention to the work of their predecessors. Britton developed this somewhat neglected side of botanical research, and eventually, in 1913, succeeded in establishing the new post of Bibliographer, filled by Dr. J. H. Barnhart, who had previously performed much of the work in his capacity of Librarian.

Britton's plans for the investigation and description of the North American flora were far-reaching. His first large work of this nature was the " Illustrated Flora of the Northern United

States and Canada" (1896-98; ed. 2, 1913). This was followed by his "Manual of the Flora of the Northern States and Canada" (1901; ed. 3, 1907), "North American Trees" (1908, assisted by J. A. Shafer), "Flora of Bermuda" (1918), "Flora of the American Virgin Islands" (1918), "Bahama Flora" (1920, with C. F. Millspaugh), and "Botany of Porto Rico and the Virgin Islands" (1923, with P. Wilson). Other areas were dealt with by his staff.

A great taxonomic enterprise initiated by Britton in 1905 was the "Flora of North America," to be completed in 34 volumes. This was "designed to present in one work descriptions of all plants growing, independent of cultivation, in North America, here taken to include Greenland, Central America, the Republic of Panama, and the West Indies, except Trinidad, Tobago and Curacao." Up to date, 73 parts belonging to 18 volumes have been issued, vol. 9 (Polyporaceae—Agaricaceae) being now complete. The account of the Mimosaceae and Caesalpiniaceae (1928-30) was the joint work of Britton and the late Dr. J. N. Rose. These authors also collaborated in what was Britton's most important piece of monographic work, namely "The Cactaceae," a magnificent quarto work in four volumes with many coloured and other illustrations, published by the Carnegie Institution of Washington (1919-23). This work illustrates a feature characteristic of Britton's taxonomic work, and shared by some of his staff, namely the treatment as "genera" of groups regarded by most other botanists as sections or subsections, or at most as subgenera. The recognition of such micro-genera is very inconvenient for all but experts, and it is hoped that the next monographer of Cactaceae may reduce their number considerably.

During Britton's tenure of office the number of publications issued by the New York Botanical Garden rose to seven. "Addisonia" started in 1916, is now in its eighteenth volume, and consists of coloured illustrations with popular descriptions of plants of the United States and its territorial possessions, and of other plants flowering in the New York Botanical Garden. "Mycologia," now the official organ of the Mycological Society of America, was started in 1909 and is now in its twenty-sixth volume. The new journal "Brittonia" was founded in Britton's honour in 1931.

The account given above embraces only a part of Britton's manifold activities. The development of the Garden and the acquisition of new plants for the living collections was the subject of his constant solicitude, and by the time of his retirement the area of the Garden had increased to 400 acres. The staff had increased to twenty-four, apart from Honorary Curators, and the Library contained over 39,000 books in addition to pamphlets. A series of popular lectures in connexion with the Garden was inaugurated in December 1895, by a lecture by Dr. (later Sir) Daniel Morris, then Assistant Director of the Royal Botanic Gardens, Kew, on the rise and progress of that Institution. This system of public lectures proved to be a very popular feature and was gradually

extended, forty-one being delivered in 1929, in addition to three winter lectures and demonstrations in the Greenhouses. A lecture in connection with this series was given by the present Director of Kew, when visiting the New York Botanical Garden after the Ithaca Conference in 1926 (*K.B.* 1927 App. 1., p. 2).

For the value of Britton's services in dealing with the intricate problems which arose, problems of a political, legal, administrative and financial nature, reference may be made to the tribute paid to him by the Scientific Directors on his retirement (Journ. N.Y. Bot. Gard, **31**, 2-4). When it is remembered that the Garden is dependent upon an annual appropriation by the City of New York, on private benefactions, and membership fees, the magnitude of Britton's achievement may be appreciated. The number of annual members, each paying $10, rose from 443 in 1896 to nearly 2,000 in 1929.

Reference should be made to "Science", vol. 80, No. 2066, of Aug. 3rd, 1934, for some interesting personal reminiscences of Dr. Britton written by his lifelong friend Dr. H. H. Rusby.

No account of Britton's career would be complete without a reference to his wife, Mrs. Elizabeth Gertrude Britton (née Knight), who predeceased him by only four months. Miss E. G. Knight was born at New York on January 9, 1858, and after graduation in 1875 at the Normal (now Hunter) College at the early age of seventeen, became critic teacher and, in 1883, Tutor in Natural Science at that Institution. She became a member of the Torrey Botanical Club in 1879, and wrote the first of a long series of papers on North American Mosses in 1883. The moss collections of the New York Botanical Garden were from the first under her charge, and she held the official post of Honorary Curator of Mosses from 1912 till her decease. In 1885 she married Dr. Britton, and three years later, after a joint visit to Kew, gave an account of the Royal Botanic Gardens at a meeting of the Torrey Botanical Club, and suggested the establishment of a similar Institution in New York (see *Kew Bulletin*, 1927, App. I, p. 3). A Committee was appointed, and its action resulted in the incorporation of the New York Botanical Garden in 1891. During the whole of her husband's directorship of the Garden, she acted as his constant helper, accompanying him on his expeditions to the West Indies and on his visits to Europe. In addition to other activities Mrs. Britton was one of the prime movers in organising the Wild Flower Preservation Society of America of which she acted as Secretary Treasurer.

The debt of the New York Botanical Garden to Dr. and Mrs. Britton may be fitly expressed by the well-known epitaph: *Si monumentum requiris circumspice.*

T. A. SPRAGUE.

Sixth International Botanical Congress, Amsterdam, 1935.—The following notice has been received from the Secretary for Nomenclature.

"Motions dealing with Nomenclature for consideration by the Congress should be sent, before January 1, 1935, to Dr. T. A. Sprague,

The Herbarium, Royal Botanic Gardens, Kew, Surrey, England, who has undertaken to collate and report on them at the request of the Executive Committee of the Congress, and the Executive Committee for Nomenclature, no Rapporteur général having been appointed at Cambridge.

" Motions must be presented in the form of additional articles (or amendments) to the International Rules, ed. 3, the English text* of which may be obtained from Messrs. Taylor and Francis, Red Lion Court, Fleet Street, London, E.C. 4, at the price of 2s. They must be drafted as briefly as possible in Latin, English, French, German, or Italian. At least 100 printed copies must be presented.

" Only motions relating to new points which were not settled at previous Congresses can be presented. Motions not complying with these conditions will not be discussed unless the Amsterdam Congress 1935 decides to take them into consideration.

" In accordance with the decision of the Cambridge Congress, the changes in the Rules made by that Congress will be considered at Amsterdam for confirmation, amendment, or rejection."

The Flora of Liverpool.†—Dr. Green is to be congratulated on the production of this revised edition of the well-known Liverpool Flora, which he edited over thirty years ago.

The chief innovation in the new edition is the series of eight short articles on areas of special botanical interest, well illustrated by vegetation photographs. Among the areas dealt with are the extensive sand dunes from Southport to Hoylake, which are among the finest in Britain, and the well-known peat " Mosses " which support a very characteristic acid-loving flora.

A popular area like the Liverpool district has, of course, been much built over during the last thirty years, and the consequent changes in the vegetation are reflected in the diminution or extinction of many of the species recorded in the earlier edition, and in the number of aliens that have been added to the list.

The black-and-white illustrations by Miss E. M. Wood, which were one of the most attractive features of the earlier edition, have happily been retained and greatly add to the value of the work.

All interested in this botanically rich area will welcome the appearance of an up-to-date edition of Dr. Green's Flora.

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*The edition in 3 languages (English, French, German) is in print and will shortly be published with examples and lists of names by GUSTAV FISCHER, Jena.

†The Flora of the Liverpool District. Edited by C. Theodore Green, M.R.C.S., L.R.C.P., D.P.H. T. Buncle & Co., Arbroath, 1933, pp. xi. + 163, 802 figures and several plates.